

08745613-111996
SECRET

FIG. 4

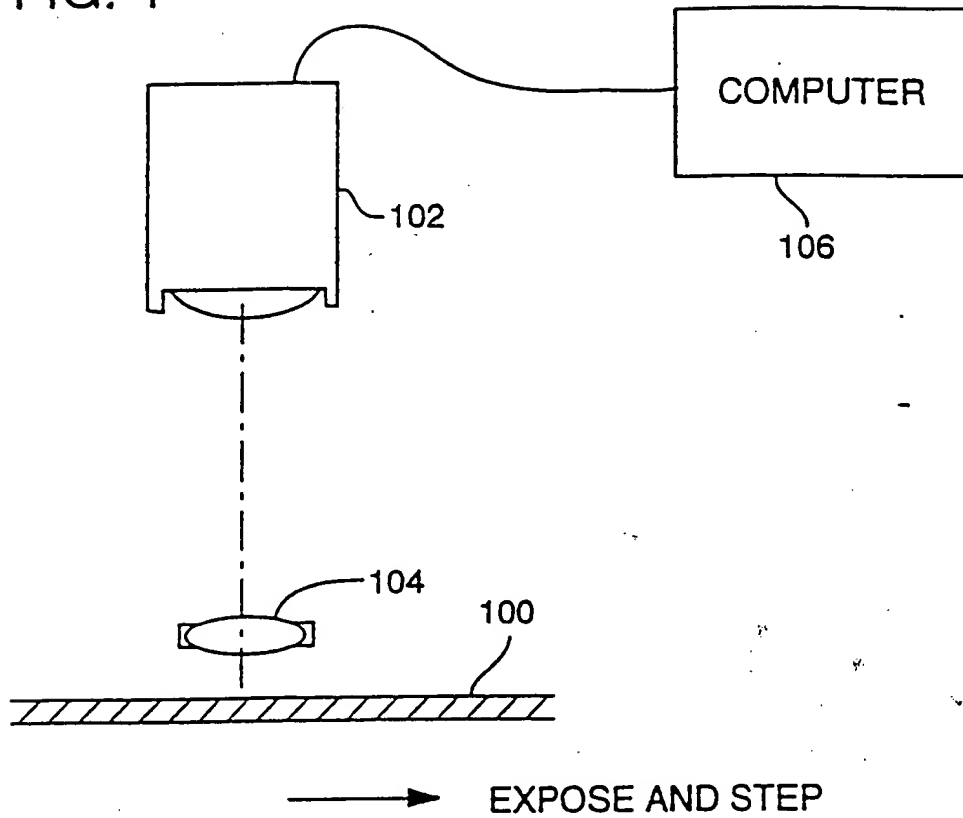


FIG. 1

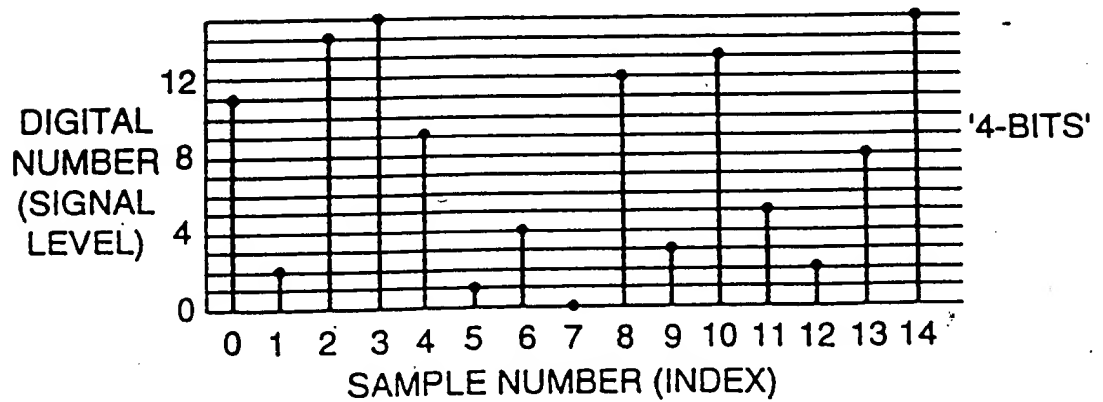
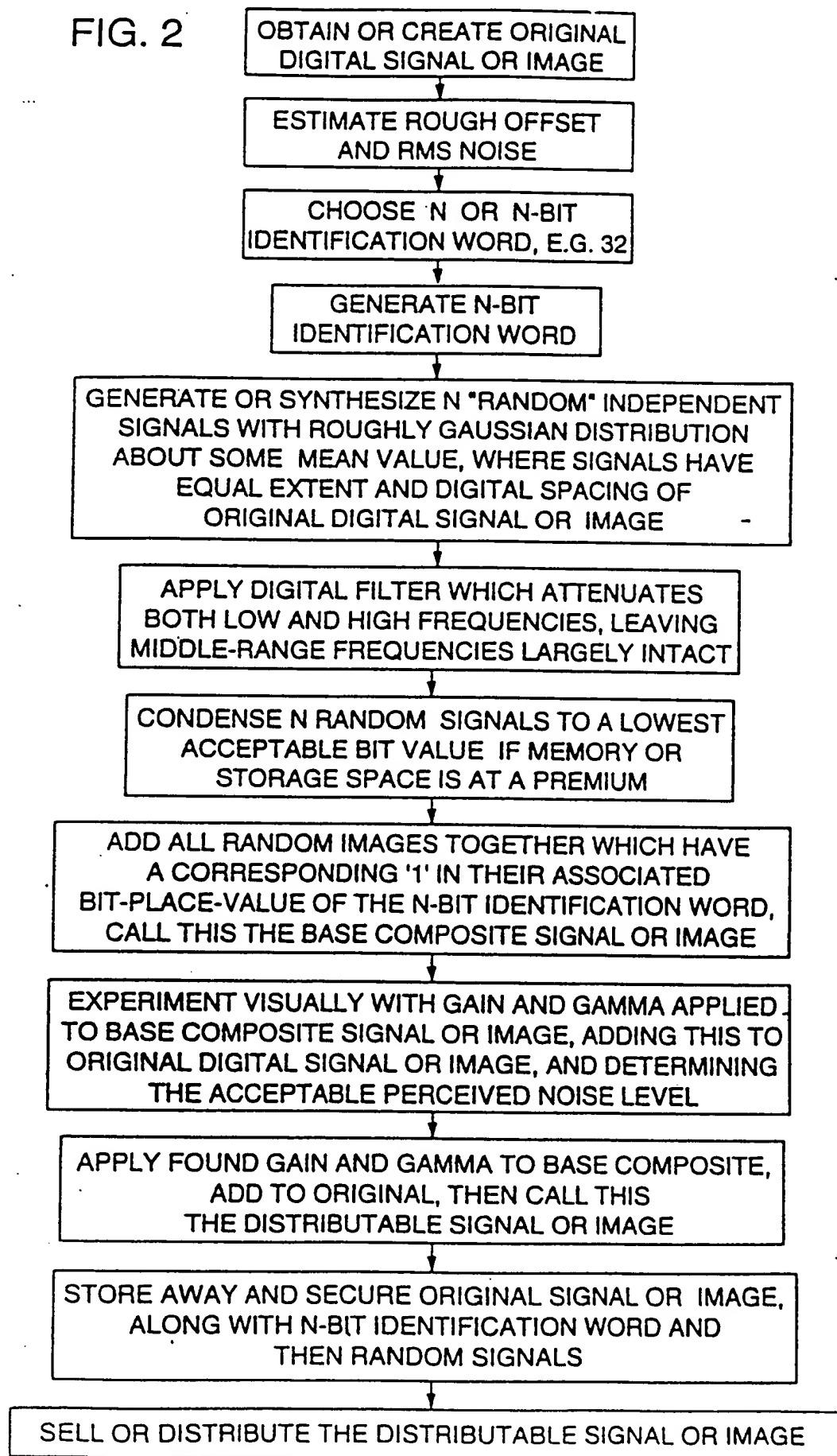
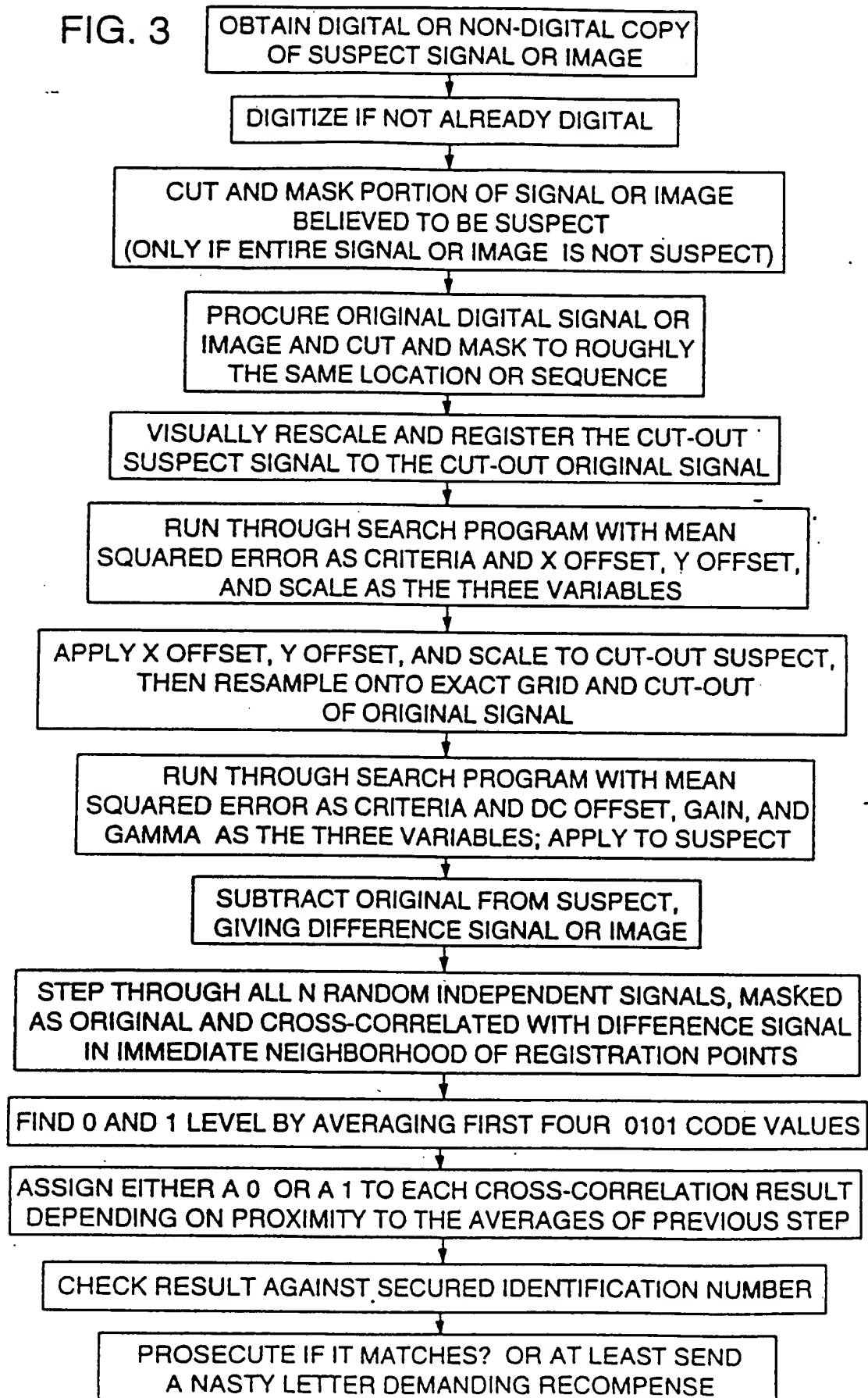


FIG. 2



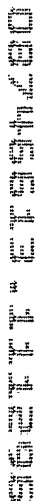
08745613-11296

FIG. 3

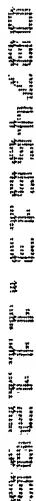


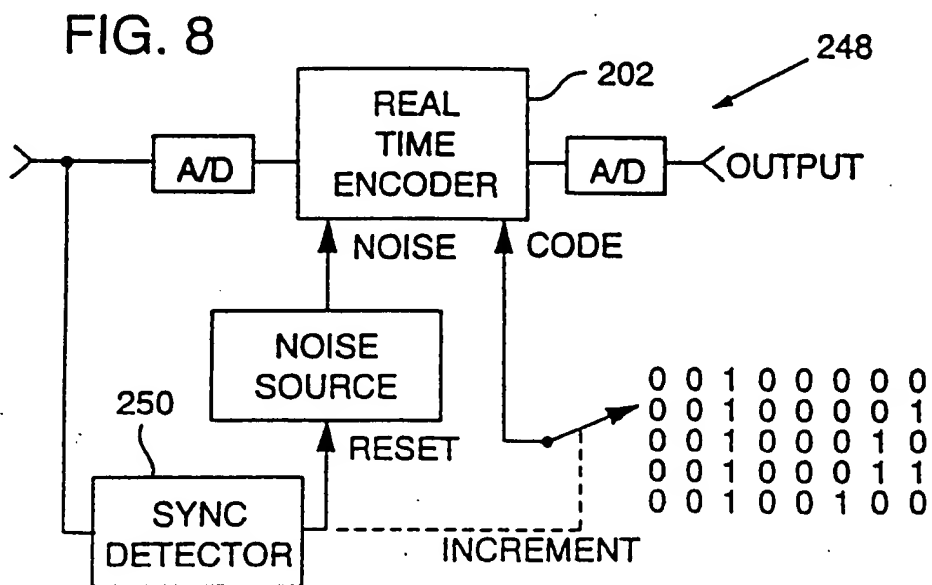
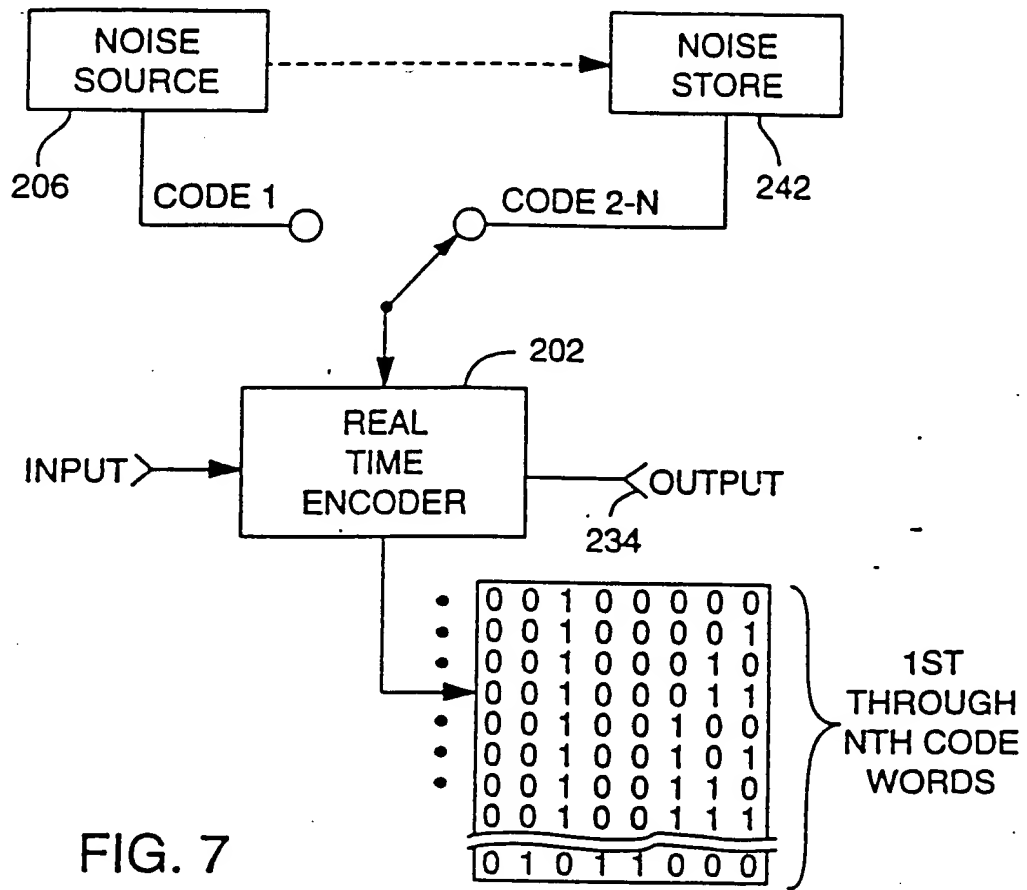
02746613 11295
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SECRET



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08746613.11396
96277"ET994280

FIG. 9A

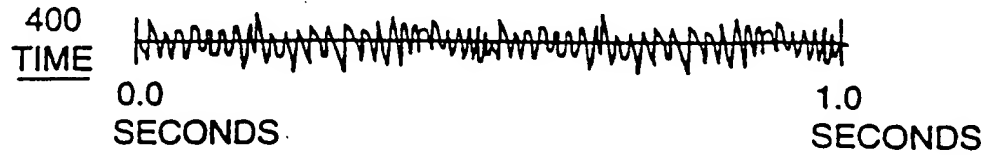


FIG. 9B

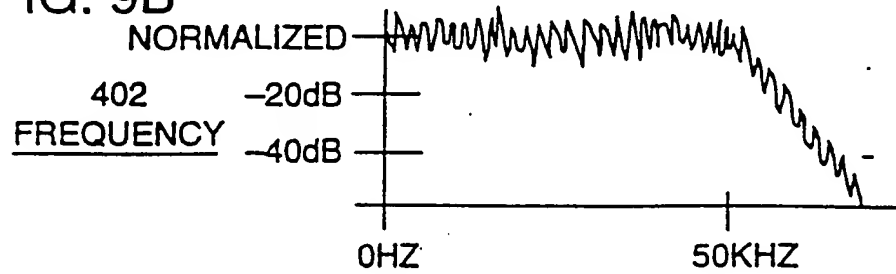


FIG. 9C

BORDER
CONTINUITY
404

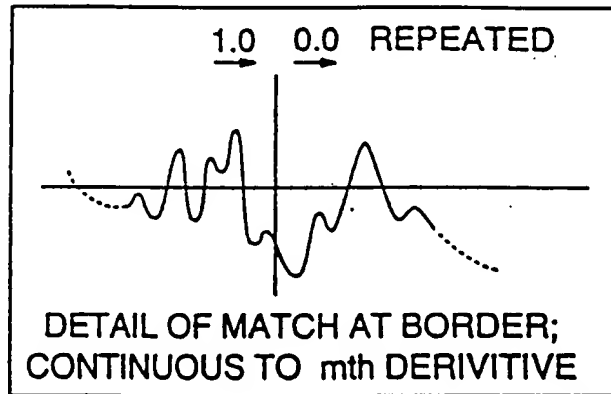
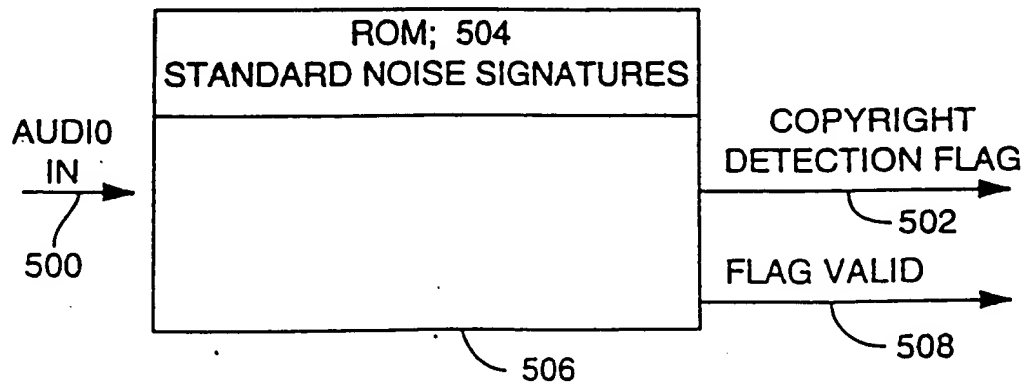


FIG. 10



08745613-11296

FIG. 11

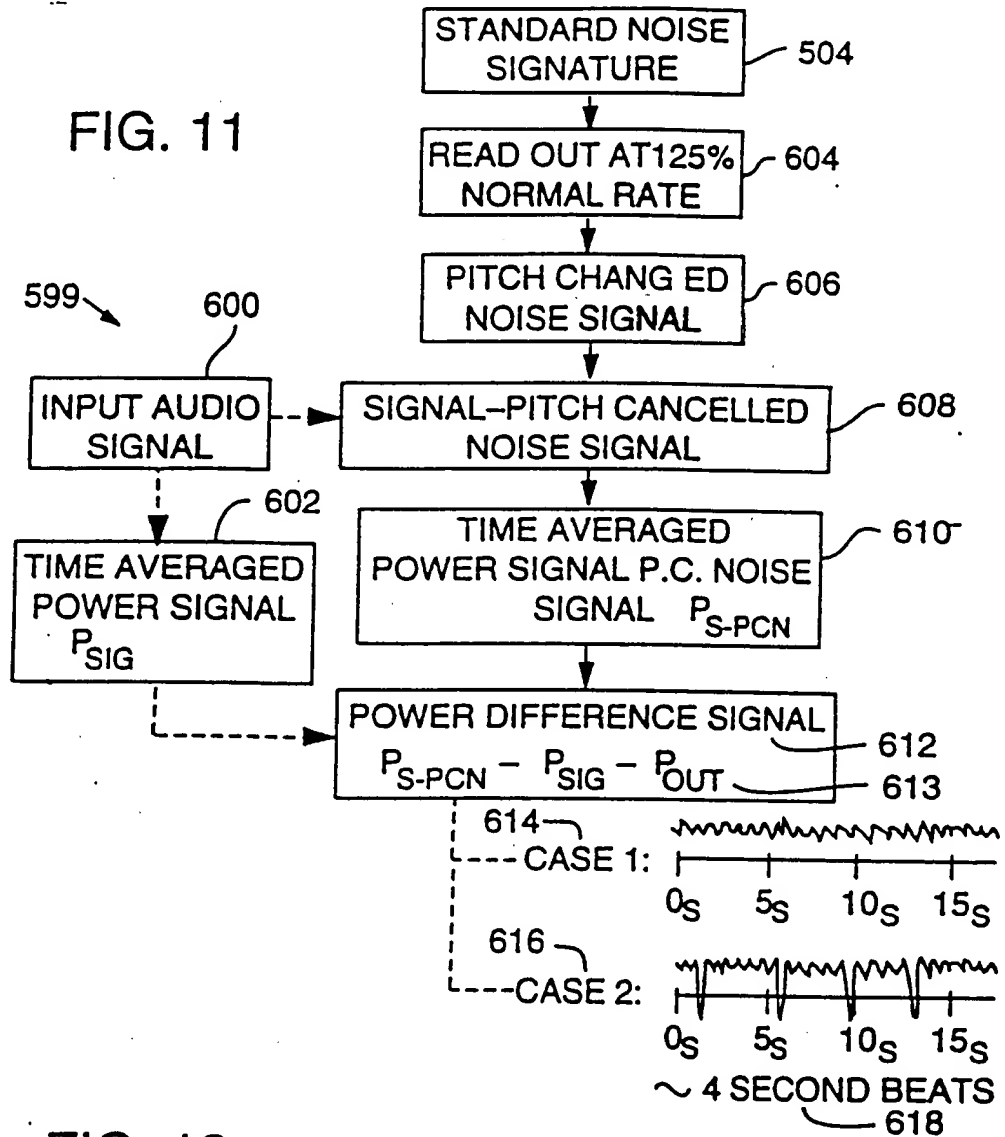


FIG. 12

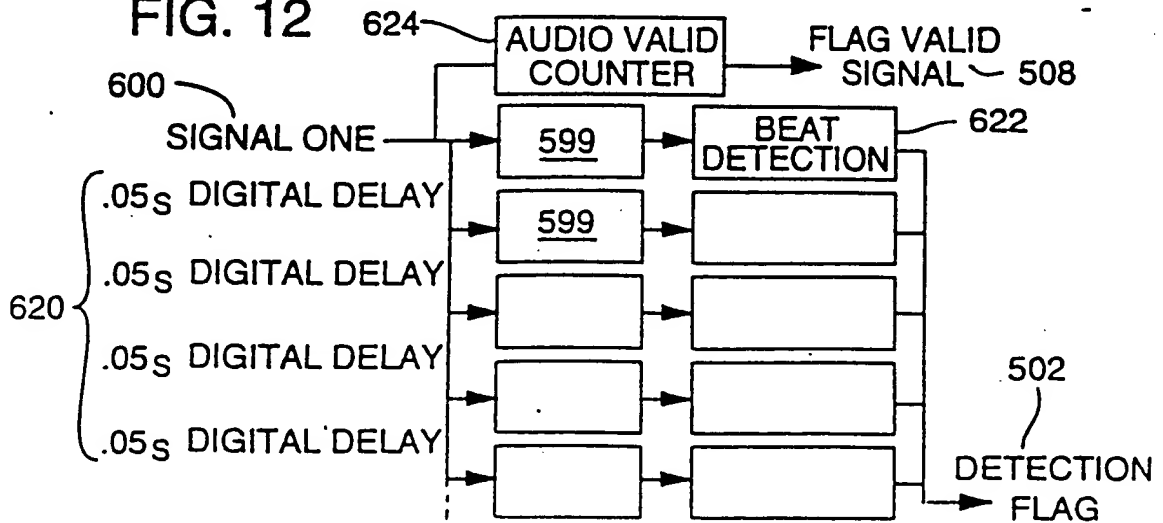
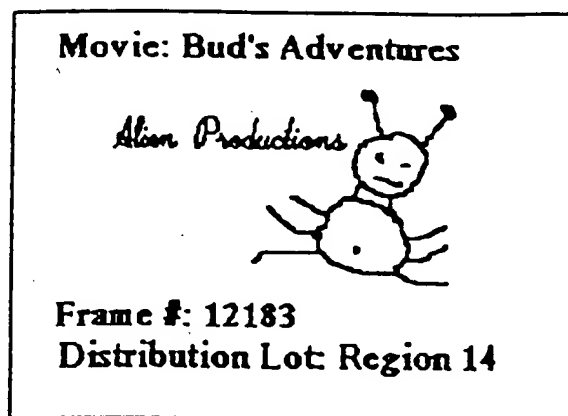


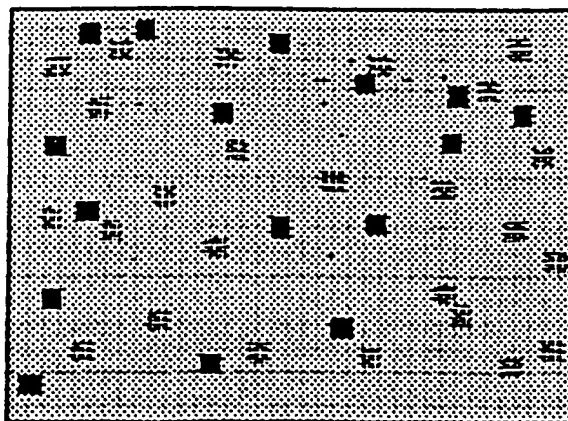
Figure 13



700



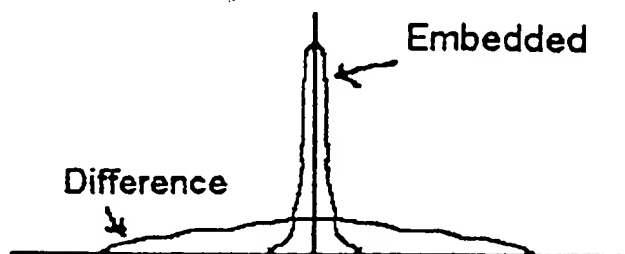
Encryption/Scrambling
Routine # 28 ,702



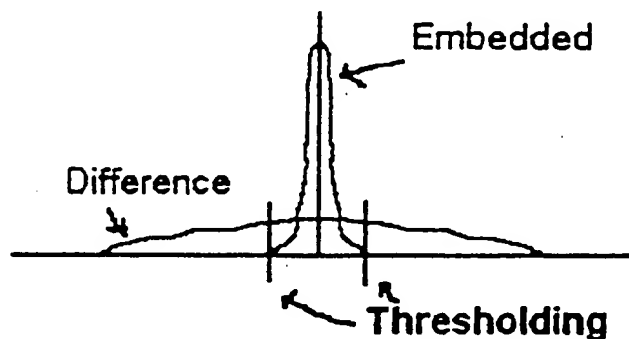
704 Pseudo-Random Master Snowy Image
(Scaled Down and Added to Frame 12183)

08745613.111295
96277.27994780

Figure 14



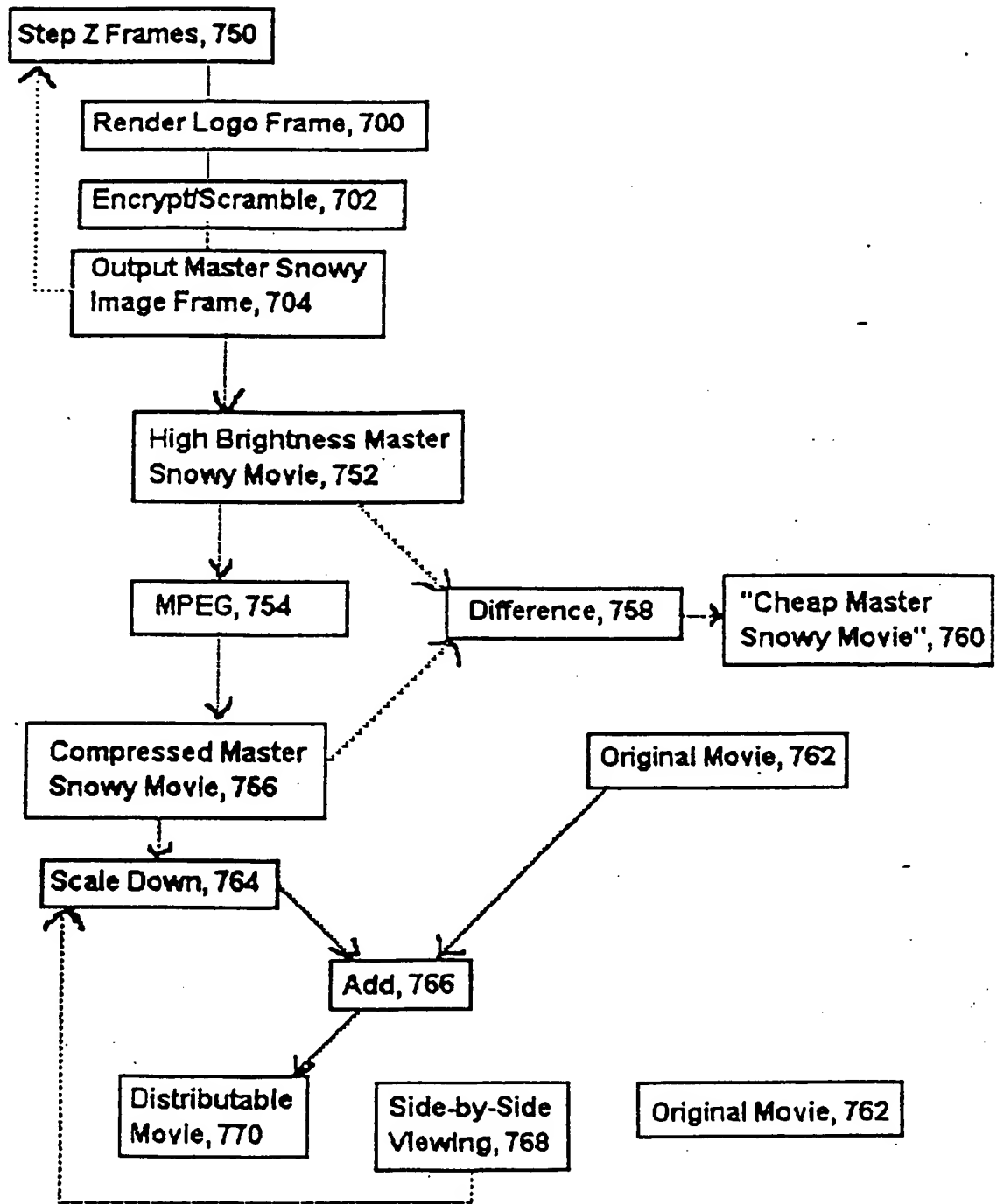
720, Mean-Removed Histograms of
Difference Signal and Known Embedded
Code Signal



722, Mean-Removed Histograms of
First Derivatives (or scalar gradients
in the case of an image)

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SECRET-ET-994/80

Figure 15



08746613-111295
SECRET

Figure 16

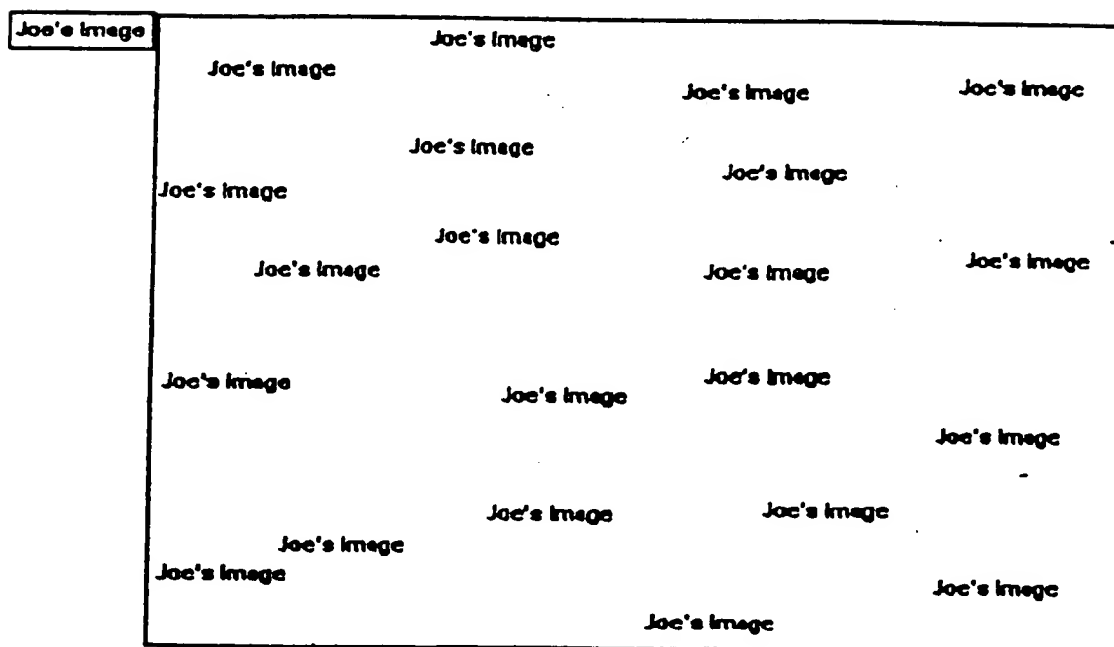
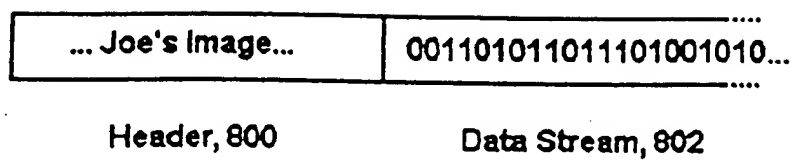
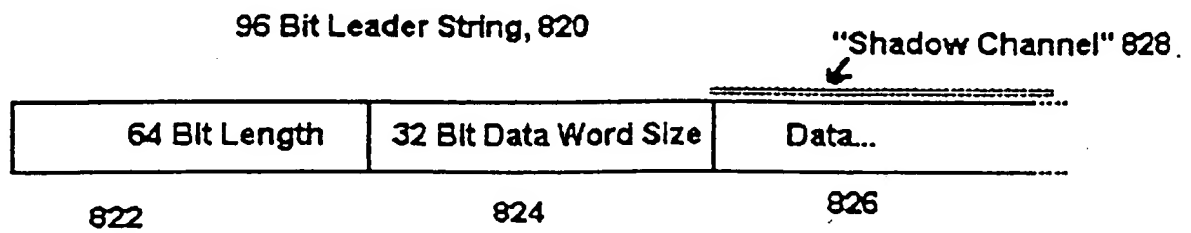
[illegible]

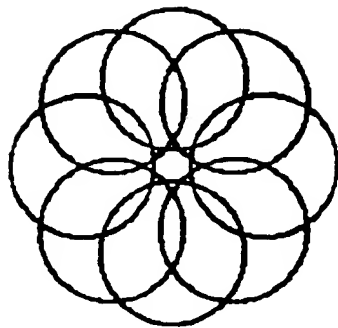
Figure 17



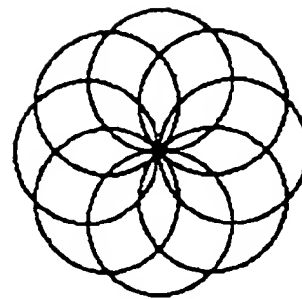
Universal Empirical Data Format

08746613-111296
SECRET-ET994280

Figure 18



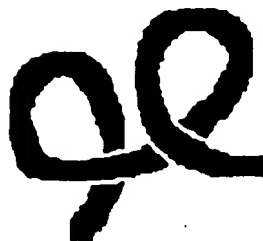
Supra-radial Knots, 850



Radial Knots, 852



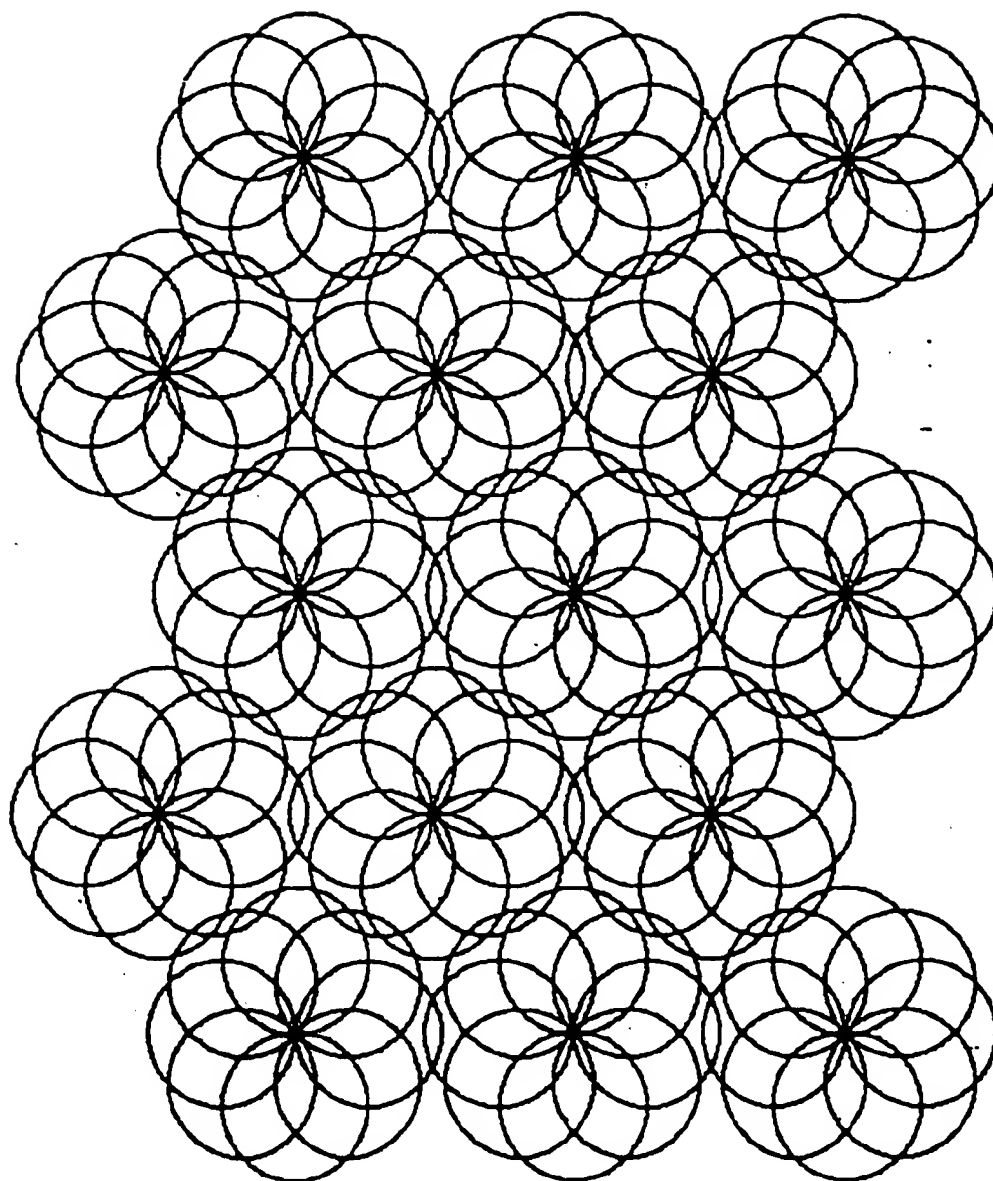
854, One basic concept of the knot is an overlapping of one strand of finite width over another strand



864, Another basic concept is the symetric weaving of overlaps

962TF ET99h/80

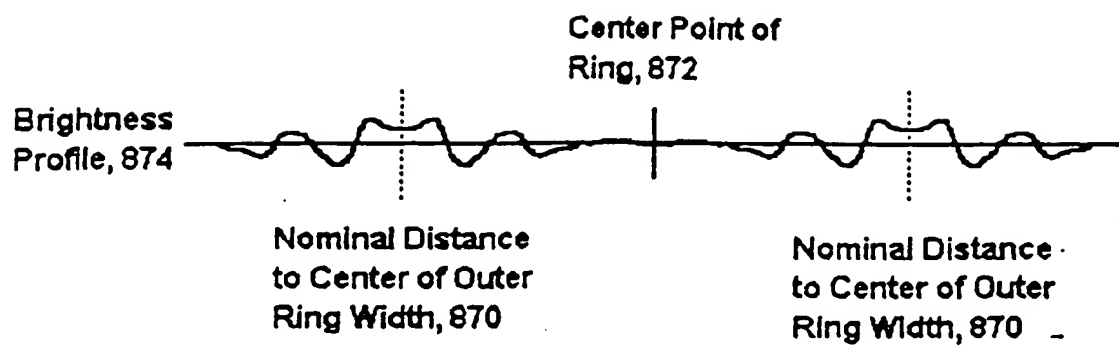
Figure 19



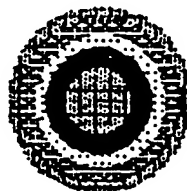
866, Quest for Mosaic Knot Patterns which "Cover" and
are Coextensive with Original Image;

All elemental knot patterns can convey the same
information, such as a signature, or each can convey a
new message in a steganographic sense

Figure 20



876, 2-D brightness of phase-only filtered ring is similar to the above brightness pattern rotated about central point of ring :



96211-ET994/80

Figure 21A

C	2C	C
2C	4C	2C
C	2C	C

where $C = 1/16$

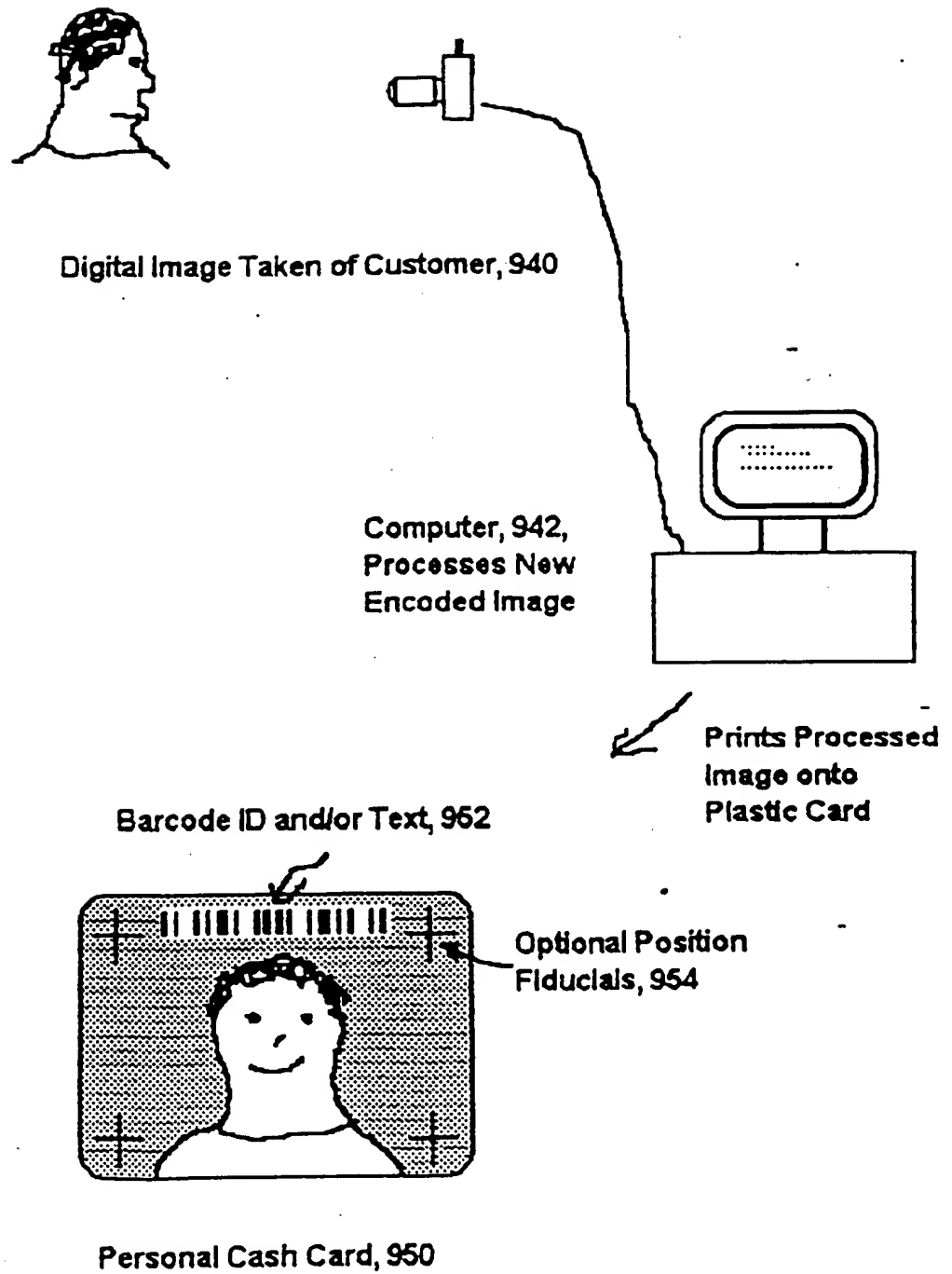
Elementary Bump, 900
(Defined grouping of pixels with weight values)

2		3		4		5		6		7		0
6		7		0		1		2		3		4
					C	2C	C					
2		3		4	2C	4C	2C	6		7		0
					C	2C	C					
6		7		0		1		2		3		4

Example of how elementary bumps, 900, would be assigned locations in an image, and those locations would be associated with a corresponding bit plane in the N-bit word, here taken as N=8 with indexes of 0-7. One location, associated with bit plane "5", has the overlay of the bump profile depicted.

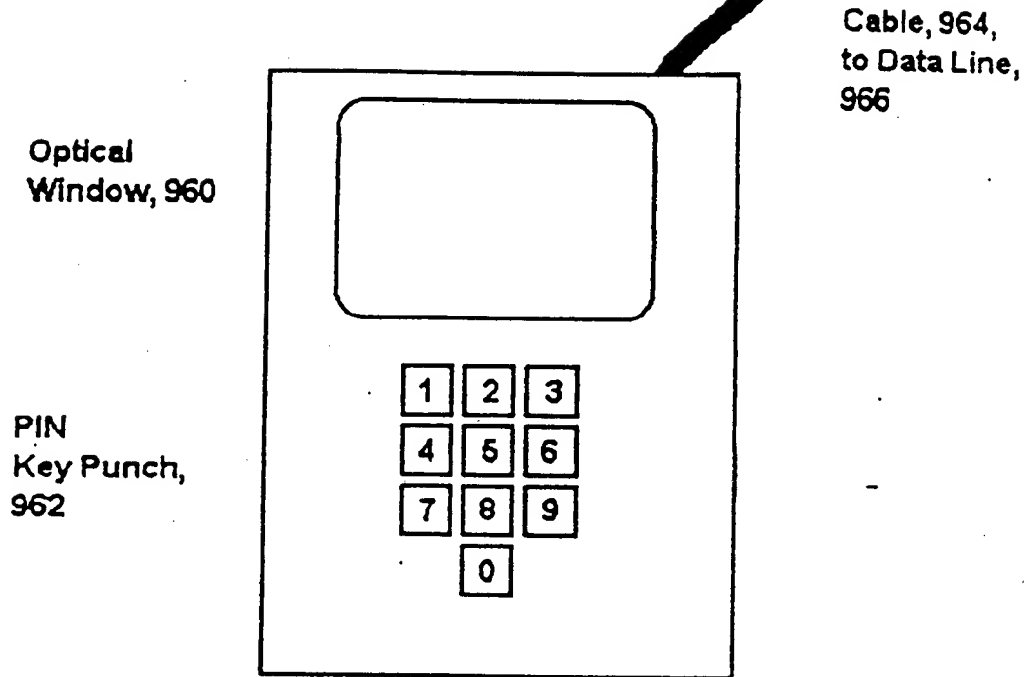
FIG. 21B

Figure 22



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SECRET

Figure 23



Low Cost Point-of-Sale Optical Reader, 958

**Contains rudimentary optical scanner,
memory buffers, communications devices,
and microprocessor**

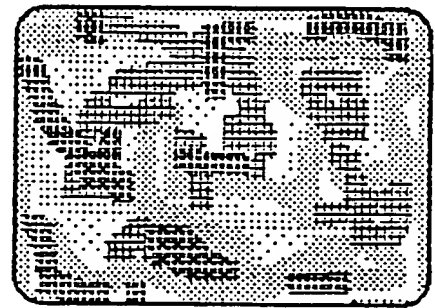
**Consumer merely places card into window and can, at their
pre-arranged option, either type in a Personal Identification
Number (PIN, for added security) or not. The transaction is
approved or disapproved within seconds.**

087463 1136
962111 EY994/80

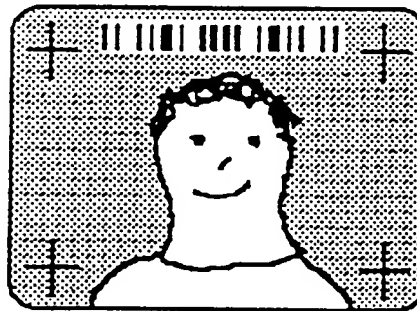
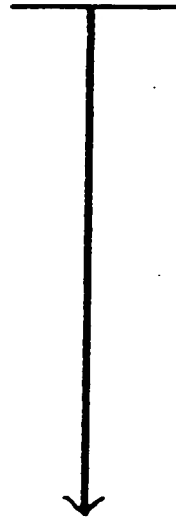
Figure 24



Original Digital Image with
Barcode and Fiducials
Added, 970



Computer generates Master
Snowy Image 972, which is
generally orthogonal to
Original Image at left



Combined to form Personal Cash Card, 950

950 970 972 950

Figure 25

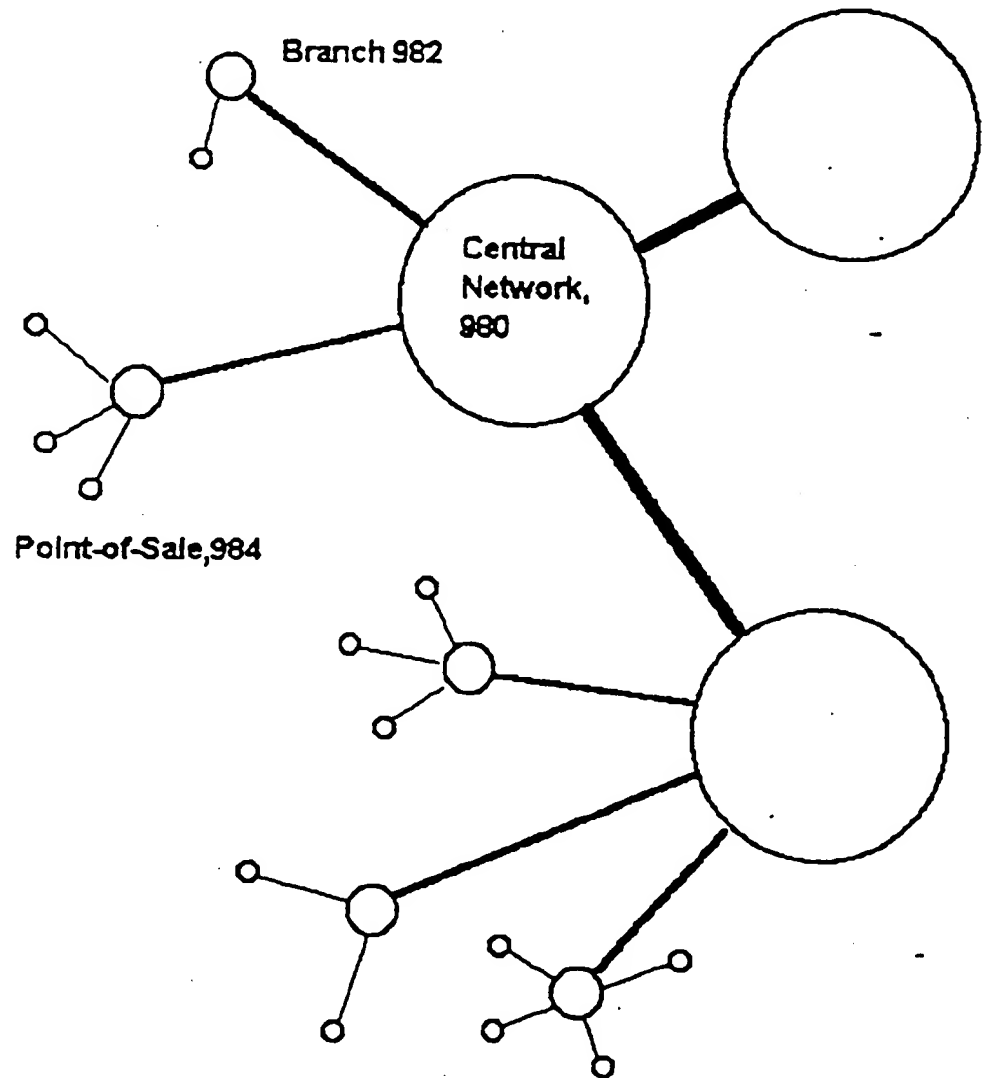
Typical Transaction Steps

1. Reader scans images on card, stores in memory, extracts persons ID
2. Optional: User keys in PIN number
3. Reader calls central account data network, handshakes
4. Reader sends ID, (PIN), merchant information, and requested transaction amount to central network
5. Central Network verifies ID, PIN, Merchant info, and account balance
6. If OK, Central Network generates twenty four sets of sixteen distinct random numbers, where the random numbers are indexes to a set of 64K orthogonal spatial patterns
7. Central Network transmits first OK, and the sets of random numbers
8. Reader steps through the twenty four sets
 - 8A. Reader adds together set of orthogonal patterns
 - 8B. Reader performs dot product of resultant pattern and card scan, stores result
9. Reader transmits the twenty four dot product results to Central Network
10. Central Network checks results against master
11. Central Network sends final approval or denial
12. Central Network debits Merchant Account, credits Card account

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95277 "CT994/280

Figure 26

The Negligible-Fraud Cash Card System



A basic foundation of the cash card system is a 24 hour information network, where both the stations which create the physical cash cards, 950, and the point-of-sales, 984, are all hooked up to the same network continuously

00745613 1111396
95211 21994280

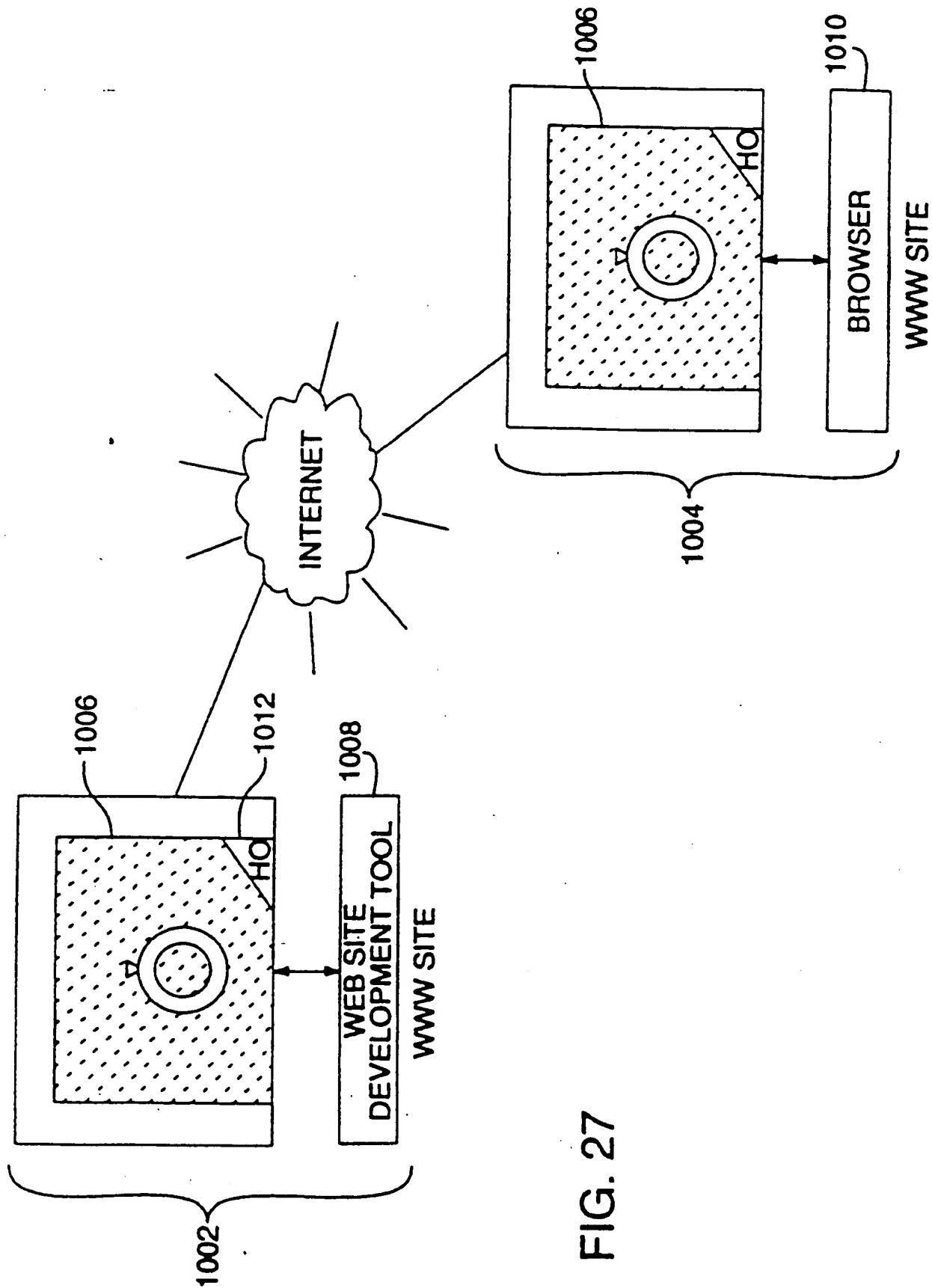


FIG. 27

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FIG. 27A

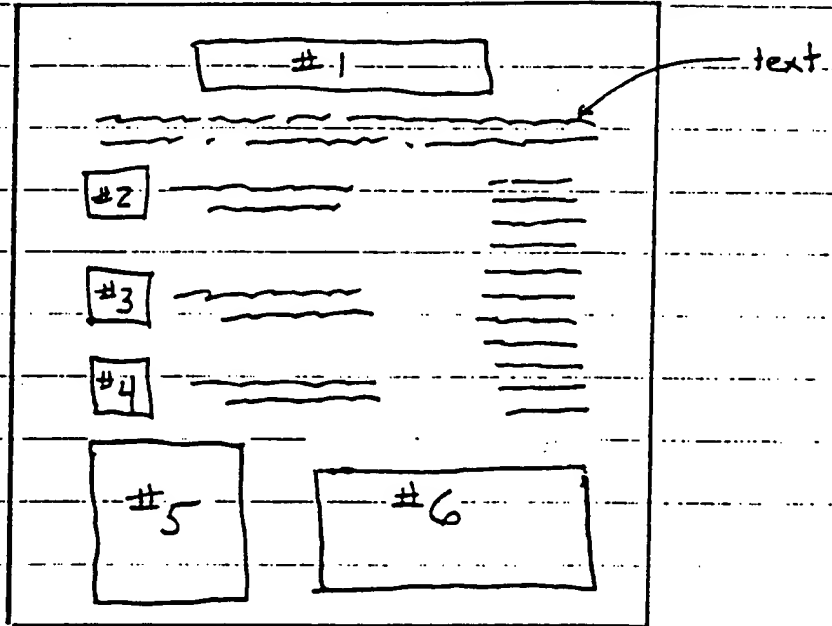
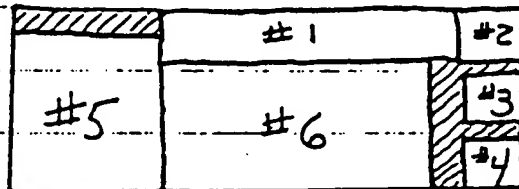


FIG. 27B

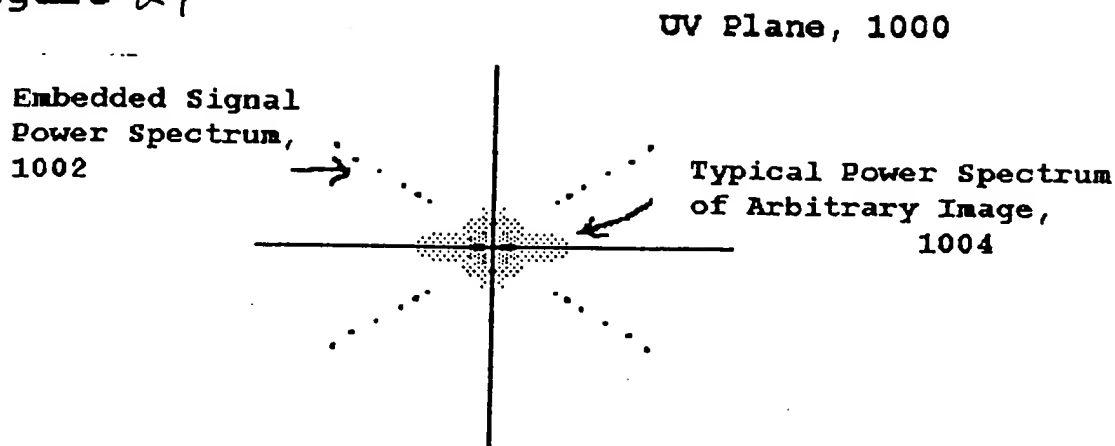


08745613-111396

Fig. 28

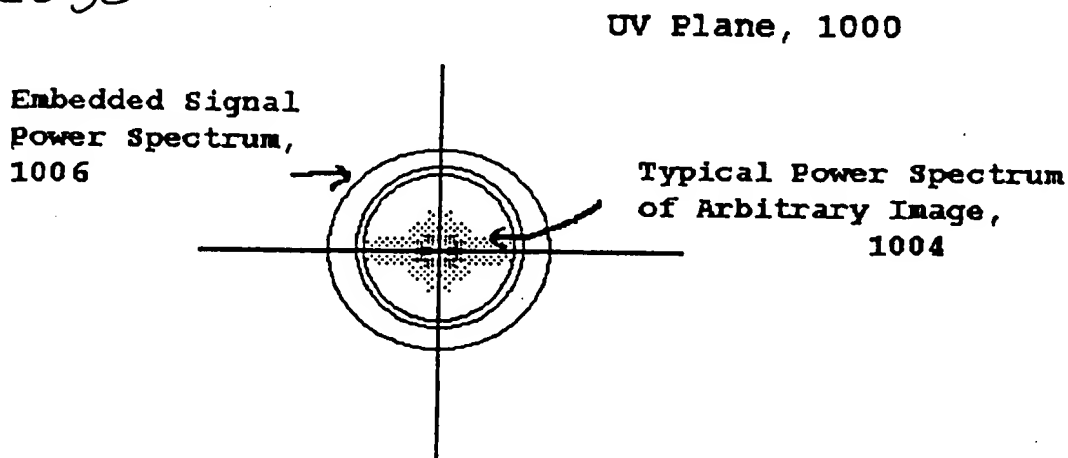


Figure 29



Non-harmonic spatial frequencies along the 45 degree axes, giving rise to a weave-like cross-hatching pattern in the spatial domain

Figure 30



Non-harmonic concentric circles in UV plane, where phase hops quasi-randomly along each circle, giving rise to pseudo random looking patterns in the spatial domain

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08746513.11295

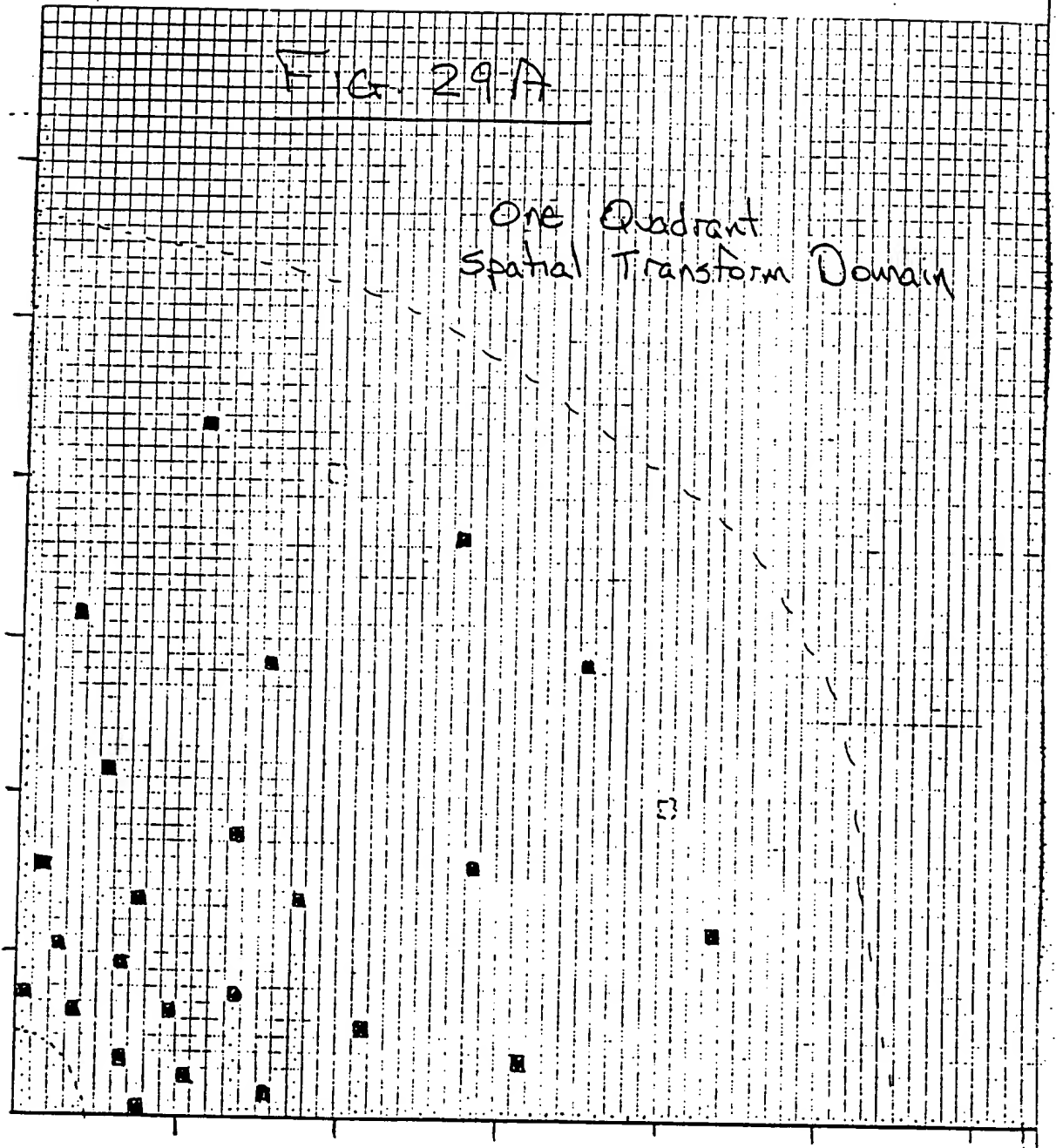
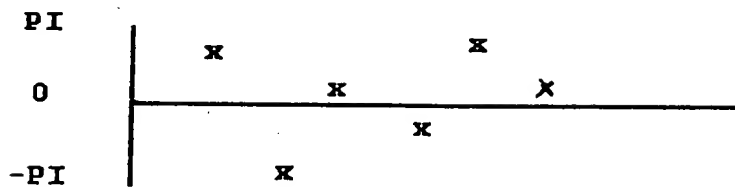
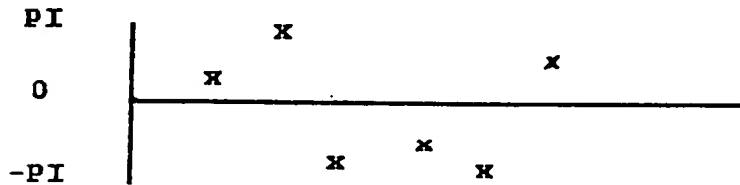


Figure 31A



Phase of spatial frequencies along forward 45 degree axes, 1008



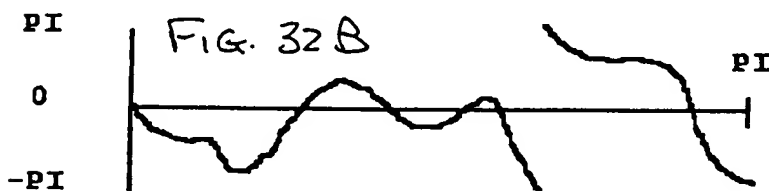
Phase of spatial frequencies along backward 45 degree axes, 1010

FIG. 31B

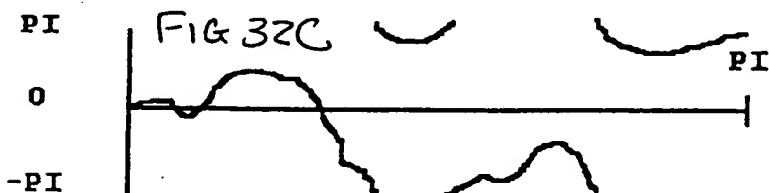
Figure 32A



Phase of spatial frequencies along first concentric ring, 1012



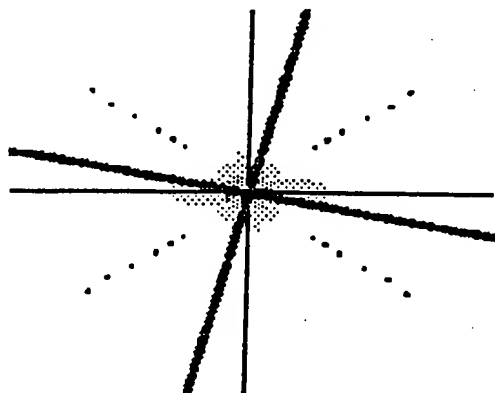
Phase of spatial frequencies along second concentric ring, 1014



Phase of spatial frequencies along third concentric ring, 1016

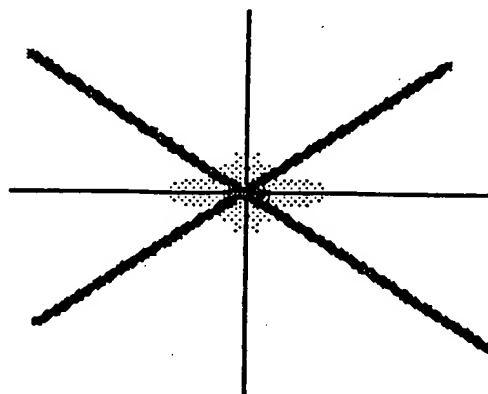
08745613-11295

Figure 33A



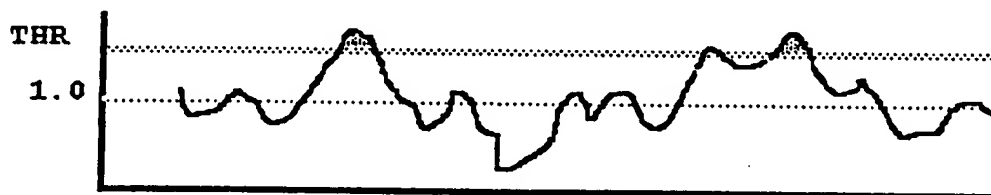
Angle A 1018

FIG. 33B



Angle B 1020

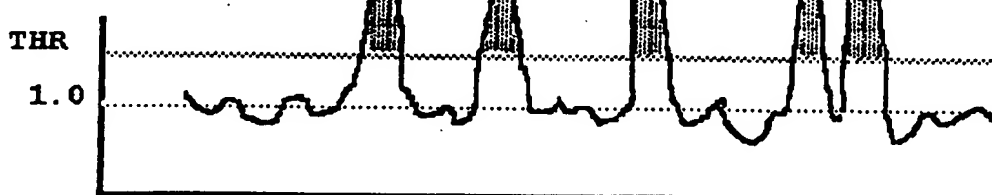
FIG. 33C



Power profile along Angle A, as normalized by its own moving average; only a minimal amount exceeds threshold, giving a small integrated value

1022

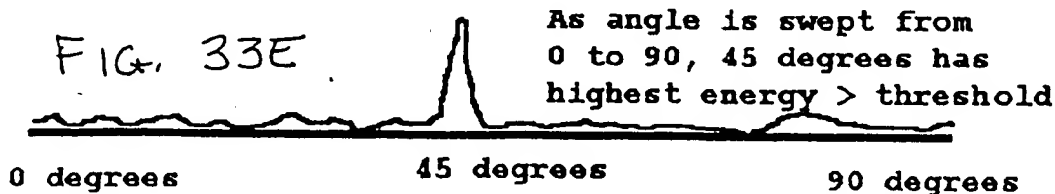
FIG. 33D



Power profile along Angle B, as normalized by its own moving average; this finds strong energy above the threshold

1024

FIG. 33E

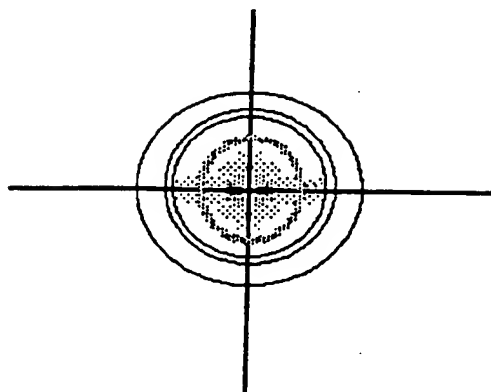


As angle is swept from 0 to 90, 45 degrees has highest energy > threshold

1026

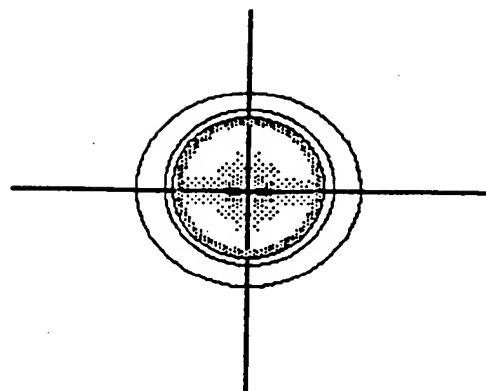
0874613-11396
96277-ET994280

Figure 34A



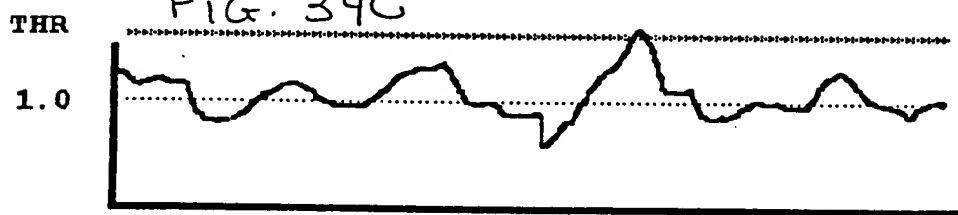
Radius A, 1028

FIG. 34B

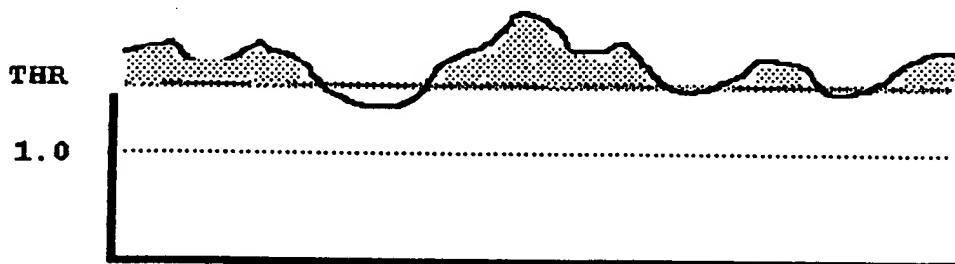


Radius B, 1030

FIG. 34C



Power profile along circle at radius A, 1032



Power profile along circle at radius B, 1034

FIG 34D

1036

FIG. 34E

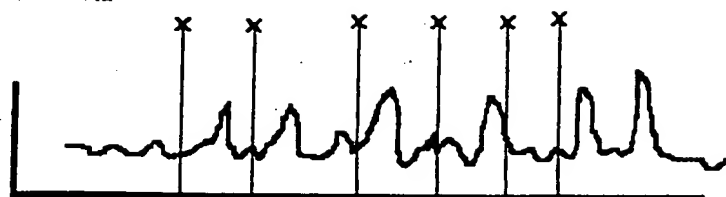
Integrated
Power > thresh



Total integrated power above threshold,
as function of radius 1038

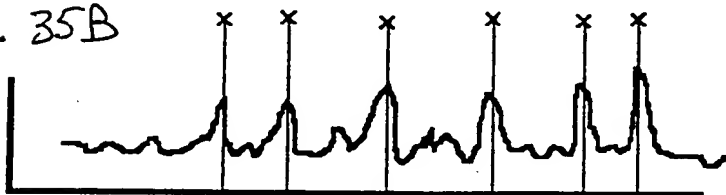
radius, 1040

Figure 35A



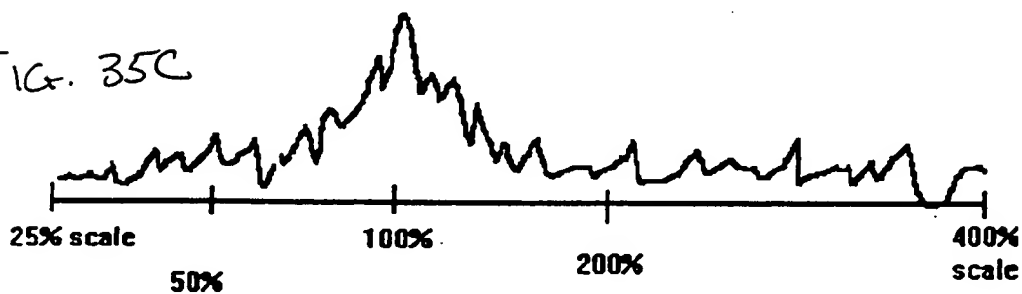
Scale = A: add all power values at the "known" frequencies, 1042

FIG. 35B



Scale = B: add all power values at the "known frequencies, 1044

FIG. 35C



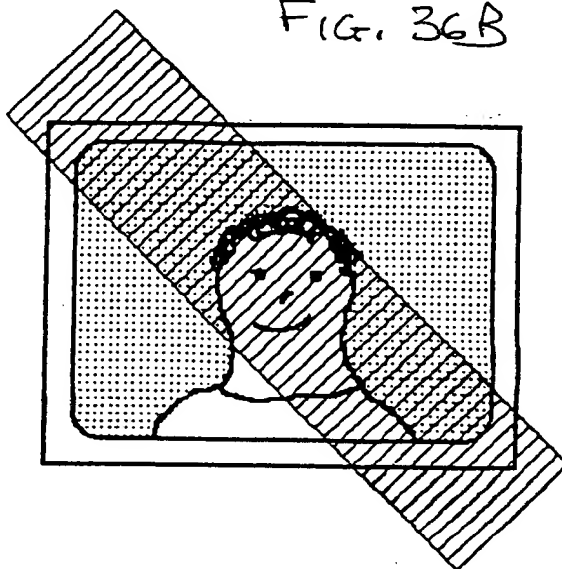
"Scaled-kernel" based matched filter; peak is where the scale of the subliminal grid was found, 1046

Figure 36A



Arbitrary Original Image, 1050,
in which subliminal
graticules may have been placed

FIG. 36B



"Column scan", 1052
is applied along a
given angle through
the center of the
image

Column-
integrated
grey
values,
1054

FIG. 36C

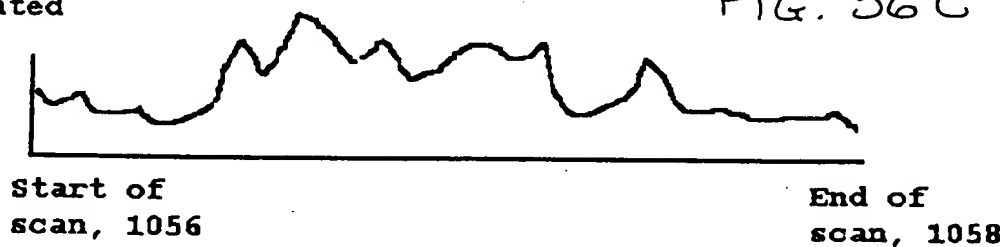


FIG. 36D



Magnitude of Fourier Transform of scan data,
1060

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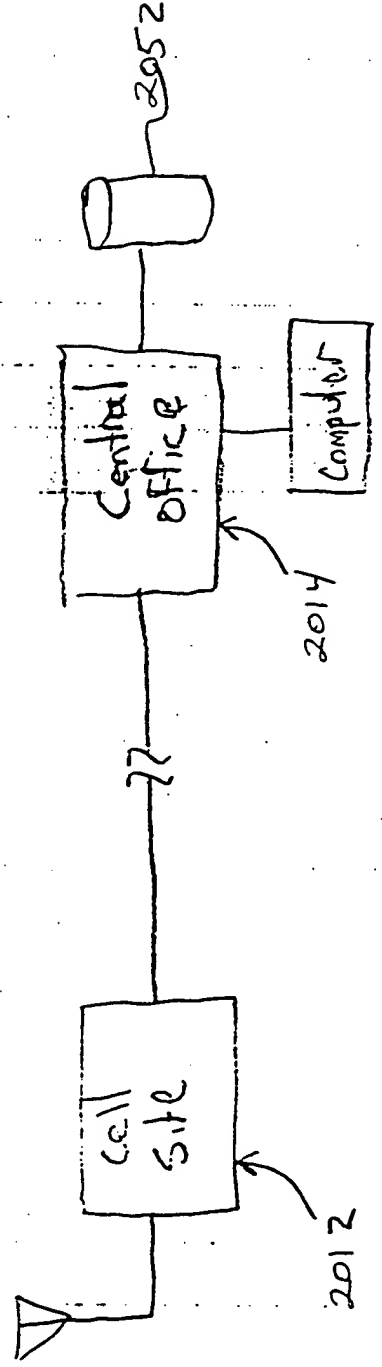
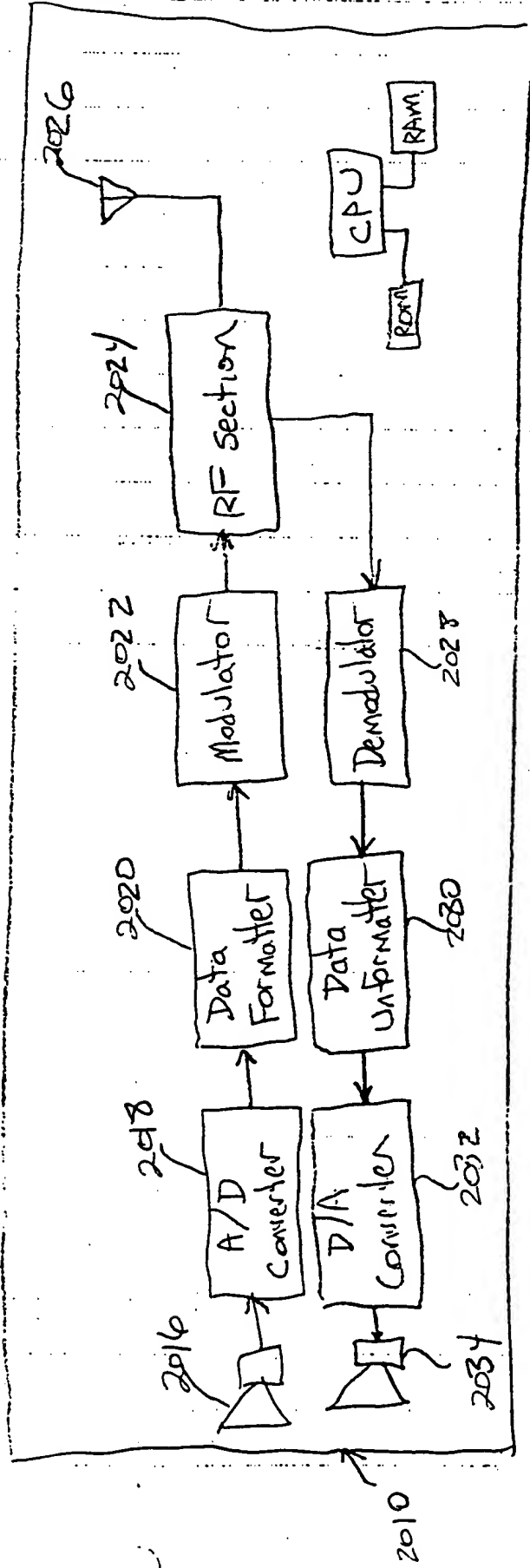
Figure 37

Process steps

1. Scan in photograph
2. 2D FFT
3. Generate 2D Power spectrum, filter with e.g. 3x3 blurring kernel
4. Step angles from 0 degrees through 90 (1/2 deg)
5. generate normalized vector, with power value as numerator, and moving averaged power value as denominator
6. integrate values above some threshold, giving a single integrated value for this angle
7. end step on angles
8. Find top one or two or three "peaks" from the angles in loop 4 , then for each peak...
9. Step scale from 25% to 400% ,step ~1.01
10. Add the normalized power values corresponding to the 'N' scaled frequencies of standard
11. Keep track of highest value in loop
12. end loop 9 and 8, determine highest value
13. Rotation and scale now found
14. Perform traditional matched filter to find exact spatial offset
15. perform any "fine tuning" to precisely determine rotation, scale, offset

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FIG. 38



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2036 ↗

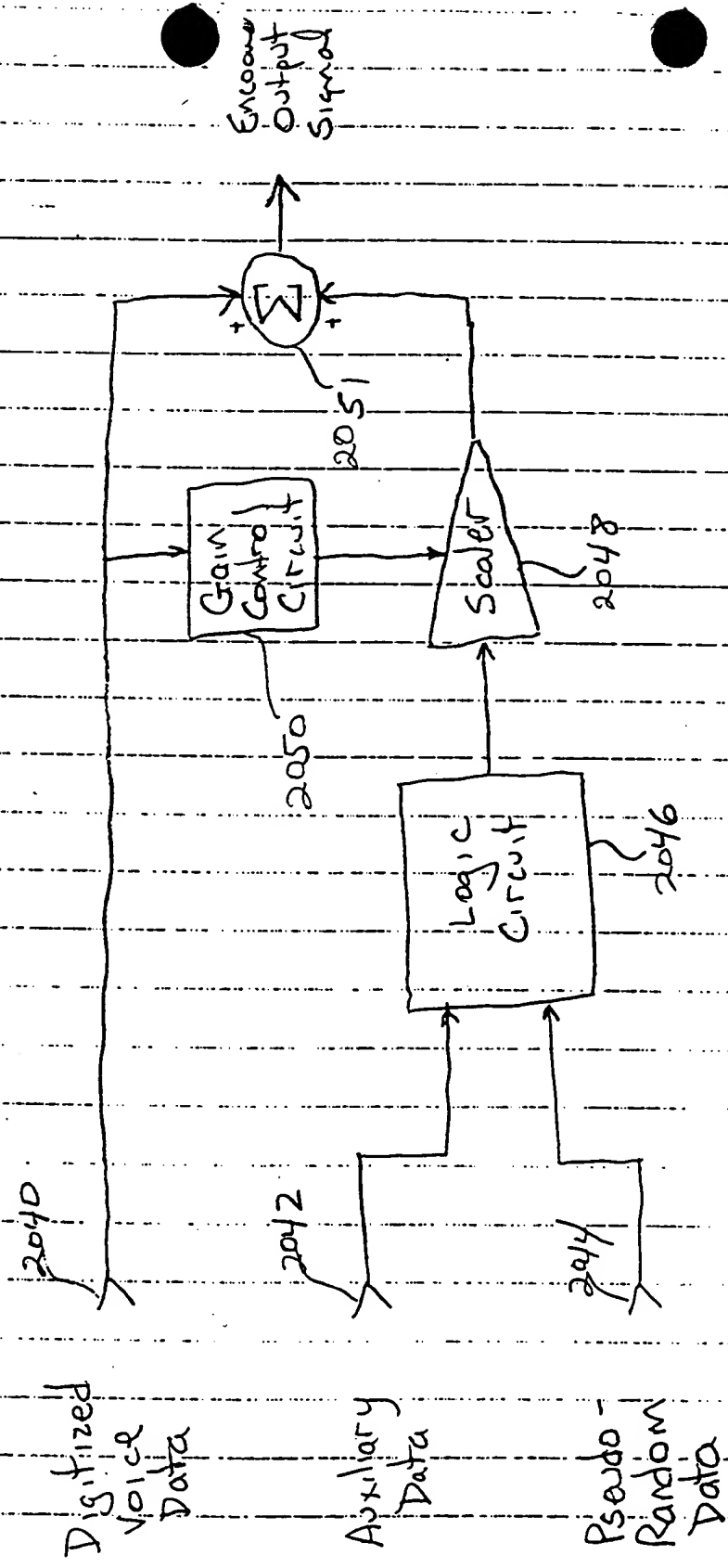
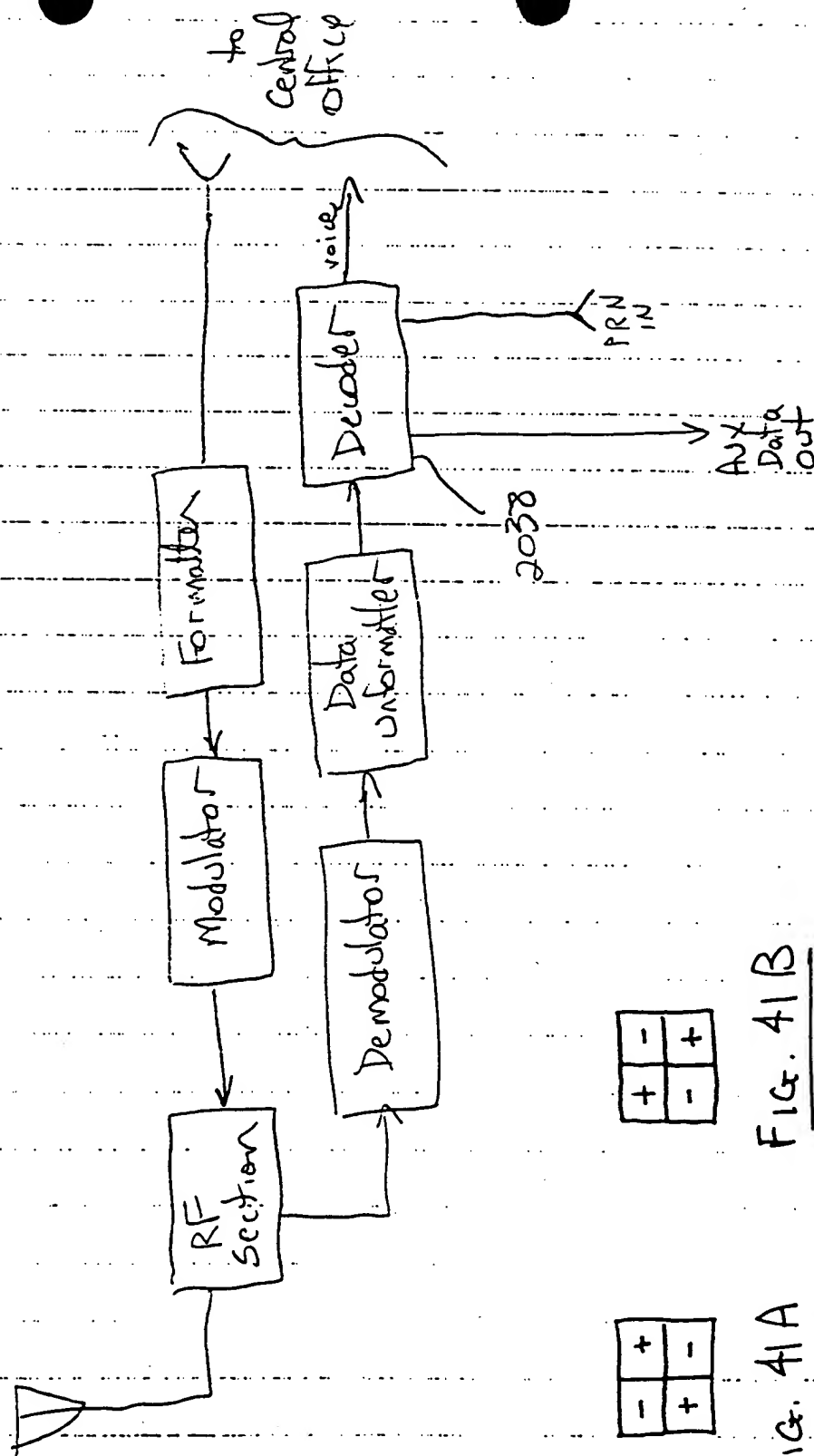


FIG. 39

SECRET ESTABLISHED

12

FIG. 40



+	-
-	+

FIG. 41B

-	+
+	-

FIG. 41A

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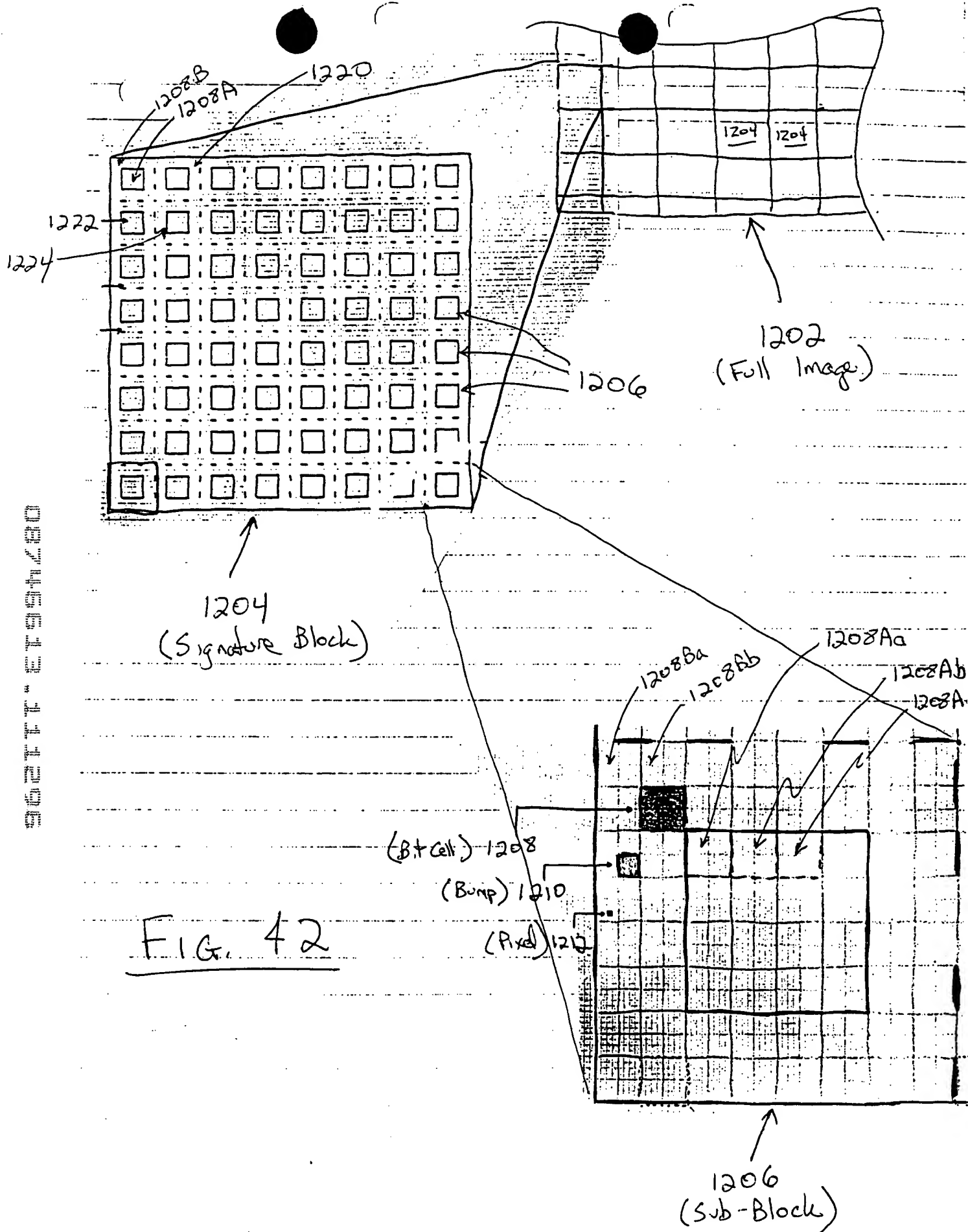
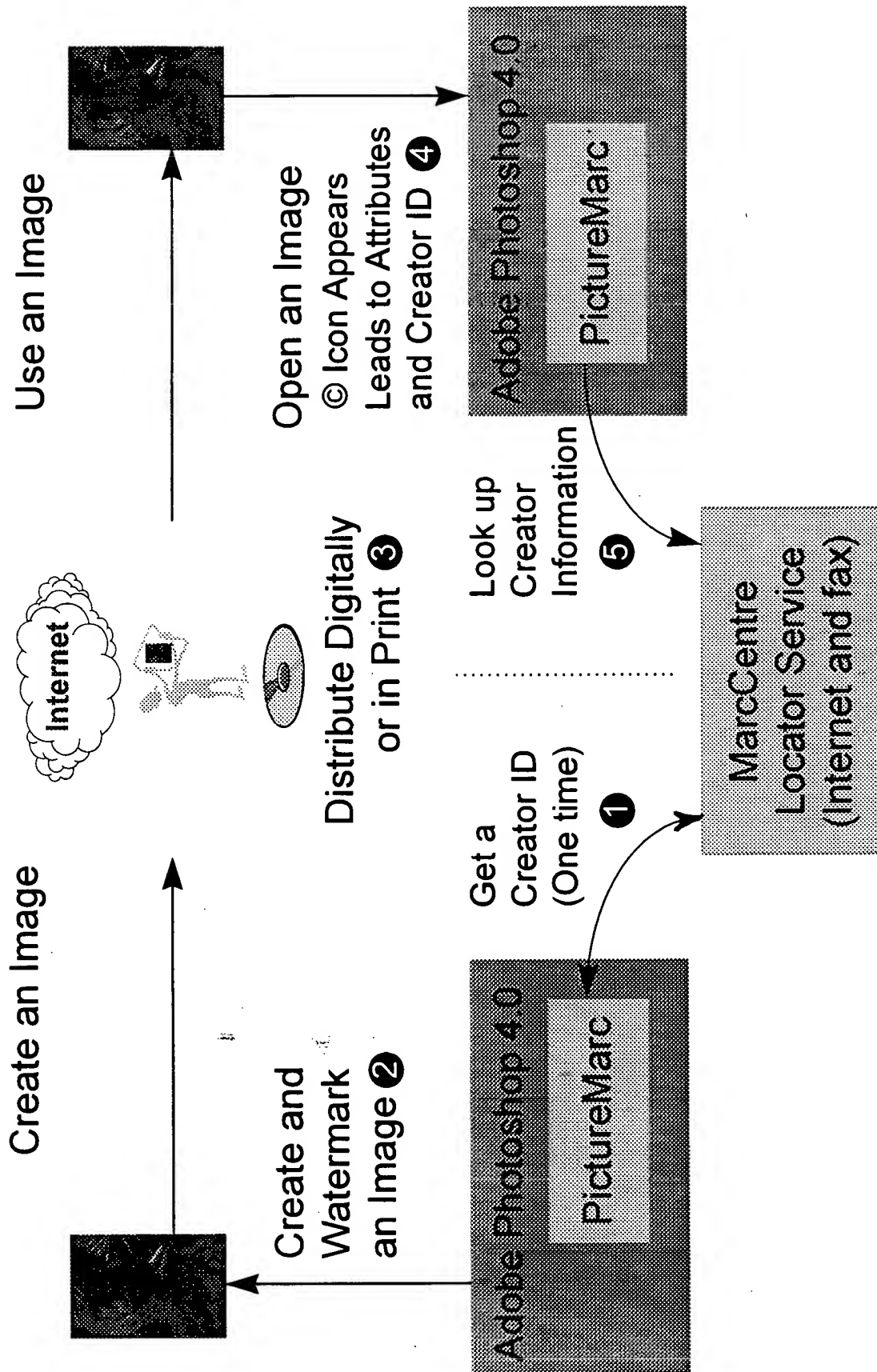


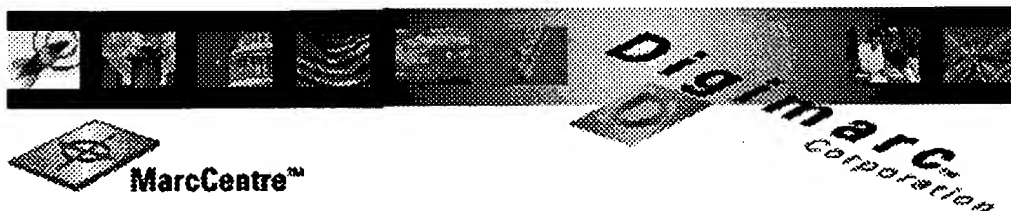
FIG. 42

FIG 43

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14





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FIG. 44



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☒ Show

☐ Don't show

Yes, I want to be on your mailing lists ☒

Please select your profession (one only).

☒ Photographer

☐ Illustrator

☐ Other

In order to communicate your primary area of focus or specialty to potential customers, please select one of the options from the list below -or- type in your own in the space next to "Custom Specialty"

Photographer

(none)

Illustrator

(none)

Custom Specialty

FIG. 45

Digimarc displays an Image of the Day showcase on our web site. Would you like to participate?

- ☒ Yes.
☐ Not at this time.

For security purposes, you will need to setup a password that allows you to edit your profile information. This password along with your Creator ID are required before you can update your contact information.

Password Re-enter to verify

--	--

The standard fee for the MarcCentre service is \$150 (US). From now until December 31st, 1996 you can subscribe for only \$79 (US), over 50% off the regular price!

For security reasons, the following credit card information is captured using secured sockets technology.

Credit Card

- ☒ Visa
☐ MasterCard
☐ American Express

Card Number

Name Shown on Card

**Expiration
(MM/YY)**

--

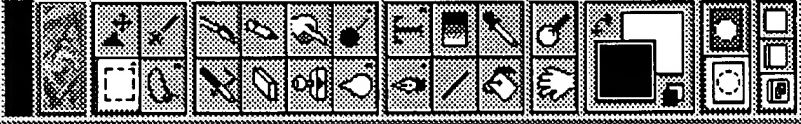
--

--

When you are satisfied with your entries on this form press the "Part 1 Complete" button and continue with the second part of the subscription sign-up. If you wish to cancel, press the Back button on your browser.

Part 1 Complete

Digimarc Copyright Notice



Fruit.jpg @ 100% (R)



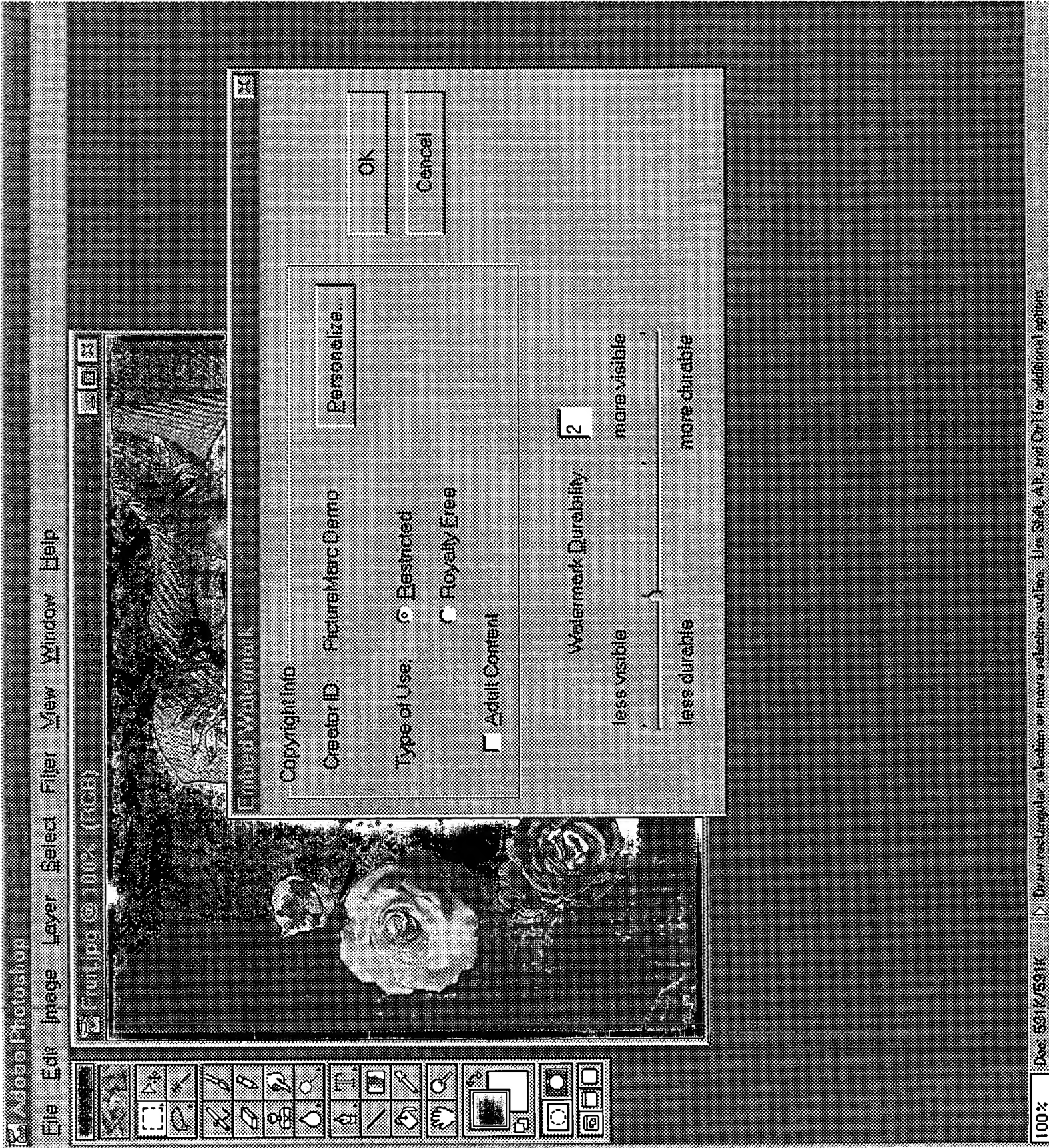
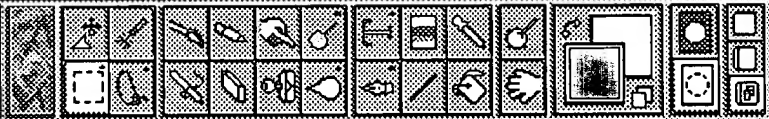


FIG. 48

Fruit.jpg @ 100% (RGB)



Embed Watermark

Personalize CreatorID

Creator ID:

OK

Cancel

Register



Click the Register button to obtain your own Creator ID via the Internet or contact Digimarc Corporation at

URL:

<http://www.digimarc.com/register>

Phone:

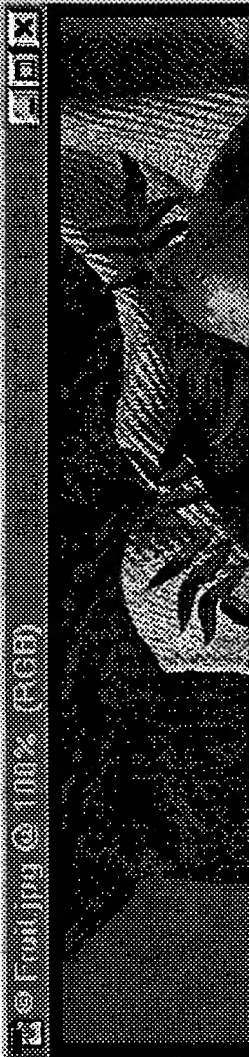
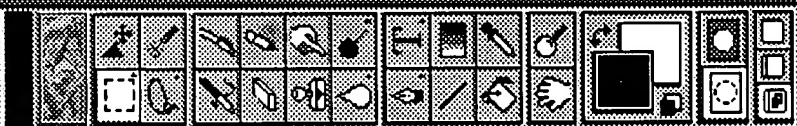
U.S. +1-800-664-8277

Intl. +1-503-223-0127

Fruit.jpg @ 100% (RGB)



E16.50



Watermark Information

Creator ID: 100001

Type of Use: Restricted

For information about the creator of this image click the Web Lookup button or contact the Digimarc Locator Service.

URL: <http://www.digimarc.com/cgi-bin/ci.pl?1+100001>

Fax Back: +1-503-223-0127

OK

Web Lookup

100% © Dec 581K/591K Filter: Read Watermark Draw rectangular selection or move selection outline Use Shift, Alt, and Ctrl for additional options.

F7G.52



Digimarc Corporation

Image Creator ID: 100001

521 SW 11th Ave, Suite 200
Portland, OR 97205
USA

Phone: 503-223-0118

E-mail: info@digimarc.com

Web: <http://www.digimarc.com>

Stock Agency or Representative.

Creator Search	Photoshop 4.0 Offer	Special Offers	Digimarc Product Center
Member Services	Subscribe	Feedback	Home

[Digimarc Copyright Notice](#)

F16.53



MarcCentre Image Creator Search

Enter the Image Creator ID in the box below and press "Submit Search". If it is a valid ID, the contact information details will be listed.

Image Creator ID:

Submit Search

If you want to search for specific image creators by a variety of criteria such as last name, specialty, city and/or state then press the "General Search" button below.

General Search

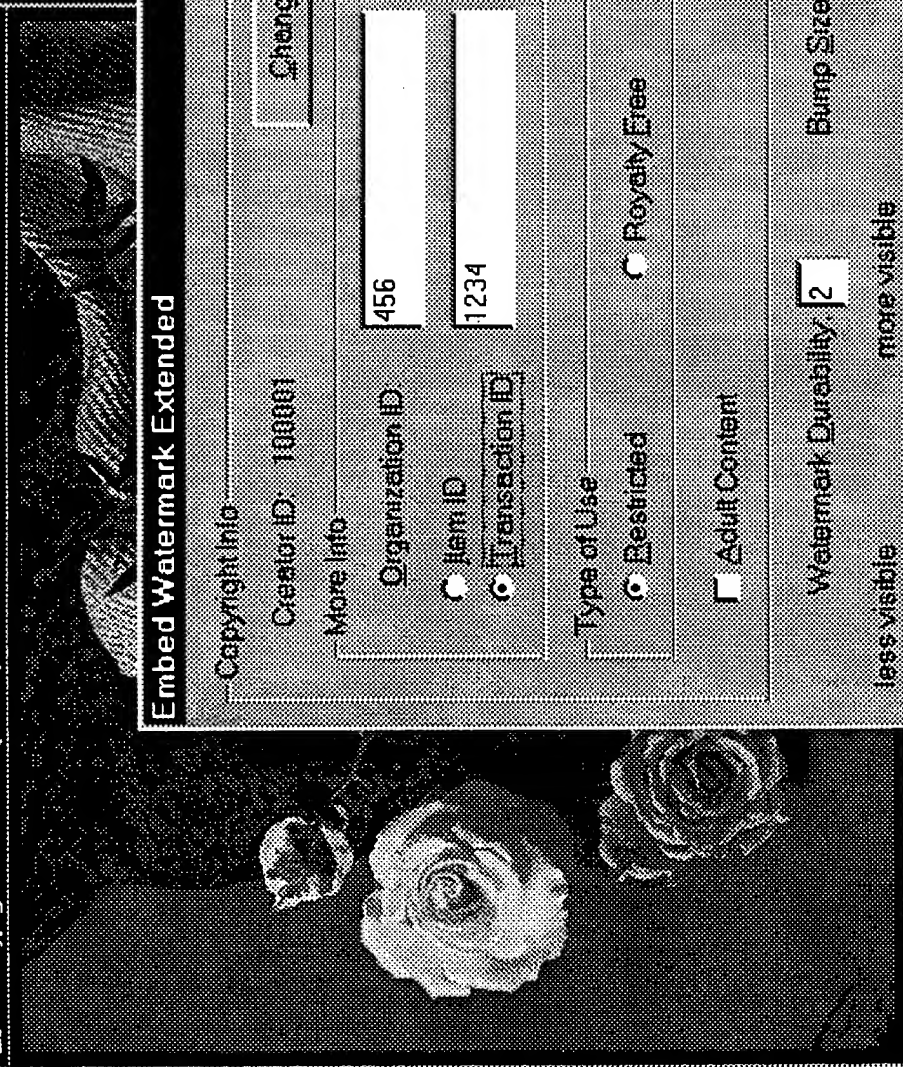
Creator Search	Photoshop® 4.0 Offer	Special Offers	Digital Photo Library
Member Services	Subscribe	Feedback	Home

Digimarc Copyright Notice

100-443886-100

FIG. 54

Fruit.jpg @ 100% (RGB)



Embed Watermark Extended

Copyright Info

Creator ID: 1000001

Change...

More Info

Organization ID:

456

☐ Item ID

☒ Transaction ID

1234

Type of Use

☒ Restricted

☐ Royalty Free

☐ Adult Content

Watermark Durability: 2

less visible

more visible

less durable

more durable

Bump Size: 1

OK

Cancel

FIG. 55

© Fruit.jpg @ 100% (RGB)



Watermark Information

Creator ID: 100001
Organization ID: 456
Transaction ID: 1234
Type of Use: Restricted

OK

For information about the creator of this image click the Web Lookup button or contact the Digimarc Locator Service.

URL: <http://www.digimarc.com/cgi-bin/ci.pl?3+100001+456>

Fax Back: +1-503-223-0127

Web Lookup

F16 56



Digimarc Watermark Detected

77 07

